Chapter 11 –Empirical research design, methods and techniques

11.1 Introduction

In chapter 1 the concept of measurement as a mathematical concept was discussed. Its use in disciplines outside mathematics involves trans-disciplinary study. At present, accounting is considered to be a measurement discipline. This suggests that the accounting concept of measurement involves trans-disciplinary study. It follows that knowledge of the accounting concept of measurement also requires knowledge of the mathematical principles of measurement.

According to Mattessich (1964), accounting measurements are dependent on the judgement of accountants. This means that the selection of the attributes to be measured and the application of the principles of measurement in measuring the attributes is dependent on the accountant. Accounting is a social science (Ryan *et al*., 2002). In chapter 1 it was noted that the theory of measurement that is applicable to the social sciences is the representational theory of measurement. Accountants must thus be familiar with the principles of the representational theory of measurement before they can measure the attributes of accounting phenomena.

The main focus of this chapter is to describe the research design and the research methods and techniques that were employed in the questionnaire survey. The research methodology employed in applying the representational theory of measurement to accounting practices was described in chapter 2. In conducting the questionnaire survey, recognized research methods were employed, namely, a literature survey and a questionnaire (Ryan *et al*., 2002). A comprehensive literature survey was undertaken and a questionnaire was prepared and sent to members of the South African Institute of Chartered Accountants.

According to Mouton (1998), the nature of the research methodology chosen is dependent on the nature of the research problem and the research objectives. The objective of this questionnaire survey was to determine whether or not accountants are aware of the status of the harmony between the accounting concept of measurement and the principles of the representational theory of measurement. This involved testing whether members of the South African Institute of Chartered Accountants are familiar with the principles of representational measurement and their application. The goal of this chapter is to discuss the research design and the research methods and techniques that were used in the questionnaire survey.

This chapter commences with a discussion of the research design in section 11.2 and its subsection 11.2.1. In section 11.3 and its subsections the research methods and techniques used in the questionnaire survey are discussed. The conclusion to the chapter is contained in section 11.5.

11.2 Research Design

The research design constitutes the blueprint for the collection, measurement and analysis of data. It is a plan according to which we obtain research participants and collect information from them (Welman, and Kruger, 2005). The factors taken into account in conducting in this research are described in the sections that follow.

11.2.1 Control of Variables

One of the objectives of this study is to determine whether or not accounting is a measurement discipline. Part of this objective is achieved by sending out questionnaires to members of the South African Institute of Chartered Accountants to determine if they are familiar with the principles of measurement. Mattessich (1964:79) asserts that accounting measurements are measurements by fiat. Measurements by fiat are dependent on the intuition of the experimenter. This means that accounting measurements are dependent on the opinion of the accountant. Therefore, in order to understand the variable that determines accounting measurement it is necessary to understand the opinion of accountants

on the concept of accounting measurement. In order for chartered accountants to be able to measure, they must be able to tell which numerical assignments give rise to measurements and which do not. To do this, chartered accountants must be familiar with the principles of measurement that establish measurements in the social sciences.

11.3 Research methods and techniques

11.3.1 Setting up the questionnaire

Statements were compiled on the basis of a literature review. The questionnaire is presented in Appendix A and the questionnaire results are discussed in chapter 12. Statements in the questionnaire items were evaluated on a 5-point agreement Lickert scale rating. Respondents were requested to indicate on a scale rating

S/D Strongly disagree
D Disagree
U Unsure
A Agree
S/A Strongly Agree

the extent to which they disagreed/agreed with each statement. The theme of the statements centred on the hypothesis of the study, that is, accountants are not aware that the accounting concept of measurement is not in harmony with the principles of representational measurement. The accounting concept of measurement must be in harmony with the principles of the representational theory because this theory of measurement establishes measurement in social science. In chapter 1 it was noted that accounting is a social science. Consequently, it follows that accounting measurements must be compatible with representational measurements.

The statements in the questionnaire were selected on the basis that they are statements made by:

a) Other researchers extracted from research literature-. There are statements about measurement that have been made by researchers in

measurement (e.g., Stevens, 1951) that this study regards as relevant to the research enquiry. There are also statements about accounting measurement that have been made by researchers in accounting measurement (e.g., Larson, 1967; Stamp, 1981) that have been judged to be relevant to the research enquiry. The use of such statements ensures that the analysis of the responses to the statement is backed by literature. This makes the analysis more credible.

b) The researcher, based on research literature- The analyses carried out in chapters 1 to 10 have indicated that accountants and accounting researchers have poor knowledge of the principles of the representational theory of measurement. It was noted in chapters 1 to 10 that accounting researchers (e.g. Gilman, 1939; Ijiri, 1975, 1967; Littleton, 1953; Paton and Littleton, 1940; Sterling, 1966) have not used the principles of the representational theory of measurement in their attempts to create a theory of accounting measurement. The researcher has studied measurement literature comprehensively (e.g., Luce *et al*., 1971, 1989, 1990), and is consequently considered to be in a position to formulate statements that can be used in the questionnaire.

The questionnaire is divided into six areas of enquiry. These areas test whether accountants are aware or not that the accounting concept of measurement is in harmony with the principles of the representational theory of measurement. Each of the sections in the questionnaire is discussed below:

1. Measurement in the accounting conceptual framework context – This section consists of five (1-5) statements, stated as follows:

1. *The accounting conceptual framework provides a foundation that sets the objectives and concepts that underlie the measurement of the attributes of economic phenomena.*
2. *Information is understandable and useful to users if it possesses the quality of meaningfulness.*

3. *Accounting information is relevant to the economic decision-making needs of the users if it is meaningful to the users.*
4. *Reliable information is information that can be empirically verified.*
5. *The comparability of accounting information is possible when the conditions of comparability are specified.*

The first statement tests whether accountants view the accounting conceptual framework as a framework for accounting measurement. The critical literature analyses carried out in chapters 3 to 10 indicate that the accounting concept of measurement is not consistent with the principles of the representational theory of measurement. However, the current accounting literature (e.g. Bierman, 1963; IASB, 2006; Wolk *et al*., 2001) asserts that accounting is a measurement discipline. The purpose of the first statement is to evaluate whether or not accountants believe that accounting is currently a measurement discipline.

The other four (2-5) statements in this section test whether accountants are aware of the link between the qualitative characteristics of financial statements and the concept of meaningfulness in representational measurement. It was established in chapter 10 that financial statements can only possess qualitative characteristics (reliability, understandability, relevance and comparability) if they possess the quality of meaningfulness.

2. Measurement and the nature of accounting phenomena- This section consists of five (6-10) statements. These are stated as follows:

6) *The future economic benefits that are expected to flow from an asset are measurable.*
7) *Liabilities have measurable attributes.*
8) *Under the accounting conceptual framework it is possible to measure the income generated by an entity in a particular accounting period.*
9) *The attributes of expenses are measurable.*
10) *It is possible to measure the attributes of future events.*

This section tests whether accountants are aware that the elements of financial statements do not have attributes that are measurable at the moment. This is

because currently the IASB (2006) framework for financial reporting points out that items that meet the definition of an element of financial statements must have attributes that are measurable if they are to be recognized in the financial statements. However, it has been established in chapter 6 that the elements of financial statements do not have measurable attributes under the current accounting conceptual framework. It follows that if accountants are aware that the accounting concept of measurement is not consistent with the principles of the representational theory, then they should know that the elements of financial statements do not have measurable attributes that describe value under the current accounting conceptual framework.

3. Measurement and the recognition of accounting phenomena- This section consists of five (11-15) statements. These are as follows:

11. *An item that meets the definition of an element of financial statements should be recognized if the item has a cost or value that can be measured with reliability.*
12. *Valuation is a process that is similar to measurement.*
13. *Value determinations continually refer to future states (Smith, 1956:116).* This statement highlights the fact that the processes of determining value are concerned with the future states of value. This indicates that value is a forecast. It can also be inferred that value cannot be empirically tested. In chapter 2 it was noted that the principles of measurement are applicable to phenomena that can be empirically tested. Therefore, value is immeasurable.
14. *Historical cost basis, current cost basis, realizable value basis, the present value basis and the fair value basis are theories of measuring value*
15. *The amount of monetary units paid to acquire a commodity is a measure of its value.*

This section tests whether accountants are aware that the principles for the recognizing items that meet the definition of an element of the financial statement are not in harmony with the principles of the representational theory of

measurement. The IASB (2006) framework for financial reporting points out that before a transaction or event is recognized as an element in the financial statement, it must possess a cost or value that can be measured with reliability. However, it has been established in chapter 7 that value and cost are not measurable under the current accounting conceptual framework. Furthermore, it was established in chapter 6 and 7 that the accounting methods of determining value are not in harmony with the principles of the representational theory of measurement. Therefore, if accountants are familiar with the principles of representational measurement they should also be aware that the principles for recognizing the items that meet the definition of elements of financial statements are not in harmony with the principles of the representational theory of measurement.

4. The integrity of accounting information created under the accounting conceptual framework-This section consists of seven (16-22) statements, specified as follows:

16. *Future events do not represent reality.*
17. *Estimates in accounting reflect measurements of the attributes of economic transactions.*
18. *Accrual accounting is mainly concerned with the measurement of the attributes of future accounting phenomena.*
19. *Income is an ambiguous concept, and is not an intrinsic property of an accounting entity (phenomenon) (Stamp, 1981).* This statement points out that the income of a business entity cannot be objectively determined. This means that income cannot be empirically tested. In chapter 2 it was noted that the principles of measurement are applicable only to empirical phenomena. It can therefore be concluded from this that income is immeasurable, as it cannot be empirically verified.
20. *Value is an ambiguous concept, and it is not an intrinsic property of an accounting entity (phenomenon) (Stamp, 1981).* This statement indicates that value cannot be determined objectively. Value cannot thus be

empirically tested. In chapter 2 it was noted that the principles of measurement are applicable only to empirical phenomena. It follows then that the value of an element of the financial statement is immeasurable.

21. *The attributes of accounting phenomena are dependent on the judgement of the accountant*
22. *Value is whatever two people are willing to trade for*.

This section tests whether accountants are aware that the information contained in the financial statements describes phenomena that are not objective. This information is supposed to be objective accounting measurement information. However, it has been noted in chapter 7 that the phenomena that are described by accounting measurement information in financial statements are not objective. But, under the representational theory, measurement magnitudes are historically and theoretically determined reflections of quantitative aspects of objectively existing entities and not merely the outcome of metricization or measuring procedures (Decoene *et al*., 1995). This means that all measurements must be empirical. It follows that if accountants are familiar with the principles of representational measurement, they should also be aware that measurement is only possible with empirical phenomena.

5. Measurement and the concept of time and accounting measurements- This section consists of seven (23-29) statements. These statements are outlined as follows:

23. *The going concern assumption is necessary for accounting measurement to occur.*
24. *It is possible to measure periodic income under the going concern assumption.*
25. *Under the going concern assumption the statement of financial position reflects true measurements of assets and liabilities.*
26. *The valuation of assets and liabilities can only occur under the going concern assumption.*

27. *The values of assets can be meaningfully added to each other in the balance sheet.*
28. *The values of the items of income in the income statement can be meaningfully added and subtracted from each other.*
29. *The income generated by cash sales and credit sales can be added to each other.*

This section tests whether accountants are aware that all measurements are dependent on the concept of time. All measurements are made at a specific point in time. For example, Sterling (1979) points out that the purpose of the measurement is to discover a magnitude at that point in time without regard to what has gone before or what will come after that point. However, it has been established in chapter 5 and chapter 9 that the accounting concept of measurement does not recognize that measurements occur at a specific point in time. In particular, this is demonstrated by the going concern concept. Sterling (1968) highlights the point that all the statements prepared under the going concern are provisional and dependent on subsequent events. Therefore, if measurement occurs at a point in time without regard to what has gone before or what will come, it means that measurement cannot occur under the going concern concept, since all statements prepared under going concern are dependent on subsequent events.

6. The principles of representational measurement- This section consists of eight (30-37) statements, which are outlined below as follows:

30. *Measurement refers to any method of assigning numbers to represent properties or qualities, according to some set of rules (Larson, 1969).* This statement reflects that there may be many ways of measuring an empirical phenomenon. It can also be inferred from this statement that a process of measurement consists of a specified set of rules of measurement and specified properties or qualities to be measured. The properties and

qualities of phenomena are mapped on to natural numbers. Measurement occurs by mapping properties of objects onto natural numbers.

31. *Measurement is a relative matter (it varies in kind, degree, type and precision) (Stevens, 1951).* This statement points out that measurements taken in different environments should not be compared unless they have been converted to a common set of measurement circumstances. It follows that accounting measurements made by different companies in different circumstances should not be compared unless they have been converted to a common yardstick of measurement.

32. *Every measurement system requires the specification of a scale of some kind (Chambers, 1997).* This statement points out that every process of measurement can only be considered as such if there is a specified scale of measurement. This suggests that in accounting all the processes that are referred to as processes of measurement should have specified scales of measurement. For example, the process of assigning monetary units to the value of an element of the financial statement should have a specified scale of assigning the units of value to monetary units.
33. *An empirically true value of a measured quantity does not exist (Margenau, 1959).* This statement reflects that there is no measurement that is accurate. All measurements must reflect an element of error. This means that if accounting is a true measurement discipline, all accounting measurements must reflect the concept of error.
34. *Measurement requires the specification of a property to be measured (Chambers, 1997).* This statement reflects that every property that is subject to measurement must be specified. In chapter 3 it was noted that the object of measurement in accounting is value. This means that the properties of value must be specified for measurement to occur.

35. *Every measurement system requires the specification of a unit in the scale (e.g., Rands, kilogram, etc.) (Luce et al.,1990).* The specification of a unit of

measurement makes a measurement unique. According to Luce *et al*. (1990) the specification of the representation to which a measurement relates gives meaning to the measurement. Statements about a measurement have significance if the phenomenon to which the measurement relates is specified. For example, it is necessary to specify whether the height of a man is in metres or in inches.

36. *Measurement should take place under specified conditions*
37. *In a measurement discipline, the property to which numbers will be assigned must be measurable*

This section tests whether accountants are familiar with the principles of the representational theory of measurement. In chapter 1 it was stated that accounting measurements are dependent on the opinion of the accountant. This means that the accountant must be familiar with the principles of measurement that are applicable to accounting and which establish measurement in accounting. In chapter 1 it was also highlighted that the principles of measurement that are applicable to accounting are the representational theory of measurement. It follows that accountants must be familiar with the principles of the representational theory of measurement. According to Stevens (1951), measurement is more immediately the goal of the experimental corner where the patient sifting of facts and relations has disentangled some of the relevant variables. This means that measurement depends on how well the experimenter understands the situation at hand. The experimenter must understand the principles of representational measurement in order to be able to apply them well enough. Furthermore, Mattessich (1964:79) states,"Most of the economic and accounting measures belong in the category of measurement by fiat, which is reflected in a certain definitional arbitrariness of our discipline." This also suggests that the measurement of economic phenomena is dependent on the intuition of the accountant. Therefore, if accountants are to measure economic phenomena, they have to be well versed in the principles of representational measurement, which establish measurement in accounting. It can be inferred from this that an

accountant who is knowledgeable about the principles that establish measurement in accounting is in a better position to judge whether the numerical assignment he or she has made is compatible with the principles of measurement applicable to that discipline.

11.3.2 Pilot testing

A pilot test was conducted during July 2007. The expert opinions of eight senior researchers at the University of Pretoria in the department of financial management were obtained. Minor changes were made to the wording of the statements.

11.3.3 Preparing a mailing list

The population of chartered accountants was defined in terms of the mailing list. Returned electronic questionnaires constituted convenience sampling of the relevant group.

11.3.4 Target population

The process of defining the population involves the identification of the target population and the construction of the sampling frame. Du Plooy (2001:100) defines the population as all possible units of analysis, while the target population is the population to which the findings will be generalised. If this is the case, it follows that the population for this study includes all accountants in the world, while the target population includes only those registered under the South African Institute of Chartered Accountants.

The objective of this study is not to generalise the findings to the target population. It should be noted that even though there is an empirical component to this study, as a whole it is exploratory in nature. Very little research has been done on the application of the representational theory of measurement to accounting. However, this is not necessarily problematic in terms of the definition of the concept “target population”. In this study, target population refers to those

units of analysis that are applicable in terms of the research problems and objectives.

11.3.5 Sampling frame

Before researchers draw a sample from the population for analysis, they should obtain clarity about the population, or units of analysis, to which their research hypotheses apply. This involves compiling a sampling frame. According to Cooper and Schindler (2003), the sampling frame can be described as a demarcation of the target population. They assert that the sampling frame is the list of elements from which the sample is actually drawn. It is a complete list in which each unit of analysis is mentioned only once. Ideally, the sampling frame should include all members of the target population. However, this is not always possible.

The study is conducted in South Africa and so the members of the South African Institute of Chartered Accountants were used because of the easy access to them. With respect to this study, the sampling frame does not include all the elements in the target population. In this study all the elements of the target population refers to all members of the South African Institute of Chartered Accountants. This is partly because the inclusion of all these elements is costly and, in addition, the South African Institute of Chartered Accountants does not give out the names or email addresses and contact details of its members.

The South African institute of Chartered Accountants, which is the largest body of qualified accountants in South Africa, has been chosen ahead of other professional Accounting Bodies around the world because the research is being conducted in South Africa. The mailing costs of the research will be reduced if the study is conducted in South Africa.

11.3.6 Sampling technique

The basic idea of sampling is that, by selecting some of the elements in a population, it may be possible to draw conclusions about the entire population. According to Du Plooy (2001), sampling is a rigorous procedure of selecting units of analysis from a larger population. Sampling can be probabilistic or non-probabilistic. Cooper and Schindler (2003) assert that probability sampling is based on the concept of random selection. Random selection is a controlled procedure that assures that each population element is given a non-zero chance of being selected. On the other hand, non-probabilistic sampling is subjective and arbitrary. Each member does not have a known non-zero chance of being included. Probability sampling is used if the objective of the research project is to generalize the findings to the population. In this case, a sample should be representative of the population. According to Welman and Kruger (2005), a representative sample is a miniature image or likeness of the population. But, if the study is exploratory in nature, with less concern about the sample's representativeness, then non-probability sampling is appropriate.

The statistics department at the University of Pretoria was employed in the design of this sample. It was noted that the South African Institute of Chartered Accountants does not provide a list of all its members. In light of this, it was recommended that the researcher in this study have the freedom to choose any member of the Institute he could find. As a result, this study has used convenience sampling.

11.3.7 Compiling a database

Due to the fact that the South African Institute of Chartered Accountants does not give out a list of names and addresses of its members the total population of chartered accountants in South Africa is not known. The researcher decided to compile a list of names and physical addresses of registered chartered accountants and auditors in the areas close to the university. This list was obtained from the telephone directory and from the list of registered accountants

and auditors as at 31 March 2006, and this was also used to represent the population of chartered accountants.

Names and email addresses of chartered accountants who are lecturers at South African universities were also obtained from university websites. However, not all universities had email addresses for their lecturers on their websites. It should also be noted that questionnaires were also hand delivered to the accounting departments of the universities that were accessible to the researcher.

11.3.8 Distribution of questionnaires

Electronic questionnaires directed at chartered accountants were sent out to companies listed on the Johannesburg Stock Exchange and to chartered accountants who are lecturers, whose email addresses could be found on university websites. As far as the respondents who were in the vicinity of the researcher are concerned, the questionnaire was hand delivered and collected in person by the researcher. Delivering and collecting the questionnaire by hand ensures a high response rate from the respondents.

11.3.9 Receiving the responses

As the total population of chartered accountants could not be determined, use was made of non-probabilistic convenience sampling. As such, representativeness cannot be guaranteed. Since the study was regarded as exploratory it was argued (Kerlinger, 1986) that all respondents included possessed the basic characteristics that the greater population of chartered accountants would possess and that these were being researched in this study. As such, they are representative of the population in a sense but since representativeness could not be guaranteed, generalizations about the population as a whole should be approached with caution.

11.4. Recording the responses

A record of all responses was kept in a Google mail account. These responses were matched with the original email message. Some respondents replied by fax. All the faxes reflected the names and addresses of the companies. This facilitated the matching of responses to original sent emails. In this way, companies that did not respond to the first email could be reminded.

11.4.1 Follow up

Regular weekly visits to the premises of the respondents whose questionnaires were delivered by hand were made. Four weeks after the first emails had been sent, a reminder was sent to all those who had not yet responded. At that stage, a total of 55 completed questionnaires, electronic and hand delivered, had been received. The cut-off date was 4 December 2007. By this date a total of 111 questionnaires had been received. These were analyzed and reported as results in chapter 12.

11.5 Conclusion

In this chapter the various research methods used in this study were described. These methods include a literature survey and the use of questionnaire. The literature review undertaken in chapters 2 to 10 was necessary in order to formulate the statements in the questionnaire which are discussed in chapters 11and 12.

In order to investigate whether accountants are aware that the accounting concept of measurement is not in harmony with the principles of the representational theory of measurement, a questionnaire was developed in MS Word format, making use of the literature review findings discussed in chapter 2 to chapter 10. The questionnaire is aimed at chartered accountants who are members of the South African Institute of Chartered Accountants. As the total population of the South African Institute of Chartered Accountants could not be determined, use was made of non-probabilistic convenience sampling. As such,

representativeness cannot be guaranteed. Since the study is regarded as exploratory, it is argued that all respondents possessed the basic characteristics that the greater population of chartered accountants would possess and that these were being researched in the study.

Chapter 12-Research results – questionnaires for accountants

12.1 Introduction

Accountants are important role players who influence the application of the principles of the representational theory of measurement to accounting. Mattessich (1964) classified accounting measurements as measurements by fiat. This means that they are dependent on the intuition of the accountant. It is therefore important that accountants are familiar with the principles of measurement that establish measurement in accounting and their application so that they can evaluate whether or not a particular numerical assignment is compatible with the principles of measurement. It was noted in chapter 2 that the principles that establish measurement in accounting are those of the representational theory of measurement. It follows that accounting cannot be a measurement discipline unless accountants are familiar with the principles of the representational theory of measurement and their application.

It has been established in chapters 1 to 10 that the accounting concept of measurement is not in harmony with the principles of the representational theory of measurement. The results of the literature review, which are reported generally throughout this thesis, support the main theme that accounting is not a measurement discipline. As such, a questionnaire was distributed to chartered accountants. The questionnaire contained 37 statements that were divided into six sections of enquiry that are bulleted below as follows:

- Section 1: Measurement in the accounting conceptual framework context
- Section 2: Measurement and the nature of accounting phenomena under the accounting conceptual framework
- Section 3: Measurement and the recognition of accounting phenomena

- Section 4: The integrity of accounting information created under the accounting conceptual framework

- Section 5: Measurement and the concept of time under the accounting conceptual framework

- Section 6: The principles of representational measurement

The respondents were asked to indicate whether they strongly agreed, agreed, disagreed or strongly disagreed or were unsure about the statements.

The purpose of this chapter is to report on the findings from the questionnaire survey. A discussion of each statement in the questionnaire is conducted. This chapter commences with a discussion of the results of the questionnaire in section 12.2 followed by an analysis of the responses in section 12.21. In section 12.3 the conclusion closes the chapter.

12.2 Results of the questionnaire

The questionnaire was distributed electronically to companies listed on the Johannesburg Stock Exchange and to chartered accountants who are lecturers and whose email addresses could be found on university websites. For the respondents who were in the vicinity of the researcher, the questionnaire was hand delivered and collected in person by the researcher. This method of delivery was chosen because the total population of the members of the South African Institute of Chartered Accountants is not known as Institute does not issue names and addresses of its members. Convenience sampling was used in respect of the population of chartered accountants. This statistical method was cleared with the statistician consulted for this thesis. The sample of 111 completed questionnaires represents the total of completed replies that were actually received from respondents. The response rate is not given for the total population of the members of the South African Institute of Chartered Accountants as it is not known.

12.2.1 Responses to the questionnaire

In the subsections that follow the responses received per statement are presented in the following order: the statements are classified according to six sections, the purpose of each section is outlined, a display of the statement, a short motivation, the results displayed in a table and a discussion of the outcome. A conclusion on the outcomes of all the different sections of the questionnaire will close the chapter.

Section 1: Measurement in the accounting conceptual framework context

This section is designed to investigate whether accountants truly believe that the accounting framework is a framework that outlines the foundations of accounting measurement. It has been noted in chapter 10 that financial reporting is regulated by a statutory framework (see, Companies Act, 1973). This means that the statutory framework regulates accountants' activities. It was established in chapter 6 that the foundations of accounting measurement outlined in the accounting conceptual framework (IASB, 2006), whose use is enforced by the Companies Act of 1973, are not in harmony with the principles of representational measurement. This means that the Companies Act of 1973 is enforcing the use of accounting principles of measurement that are not in harmony with the principles of representational measurement. If this is the case, it can be inferred from this that the measurement beliefs of accountants that are reflected in accounting measurement practices might be because they have no choice to make in accounting measurement but just to follow the statutory regulations, when in fact they are aware that the foundations of accounting measurement outlined in the accounting conceptual framework are not in harmony with the principles of the representational theory of measurement.

Furthermore, the IASB framework (2006) for financial reporting views its objectives as the establishment of a basis for determining which events should be reported, how they should be measured and the format in which they should be

communicated to users. This gives the impression that the conceptual framework establishes the basis of accounting measurement. It is therefore necessary to determine whether accountants consider the framework to be a basis of accounting measurement.

The section also investigates whether accountants are aware of the link between the qualitative characteristics of financial statements and the measurement concept of meaningfulness. The IASB framework (2006) for financial reporting points out that accounting information is useful to users if it possesses the qualities of relevance, reliability, understandability and comparability. In chapter 10 it was noted that the characteristics of relevance, reliability, understandability and comparability could only be possessed by information that reflects the measurement characteristic of meaningfulness. Furthermore, as has been noted in chapter 10, the quality of meaningfulness is fundamental to all measurement information. It has also been noted that accounting information is not currently meaningful. It is therefore necessary to test whether accountants are aware of the link between the qualitative characteristics of financial statements and the concept of meaningfulness. The analysis of the responses to the statements in this section is reflected below.

Statement 1: *The accounting conceptual framework provides a foundation that sets out the objectives and concepts that underlie the measurement of the attributes of economic phenomenon.* The IASB framework (2006) for the preparation and presentation of financial statements sets out the objectives and theoretical principles which form a reference for the accounting discipline. According to this framework, an item that meets the definition of an element of financial statements should be recognized if it has a cost or value that can be measured with reliability. In this case, the framework identifies cost and value as attributes whose measurement is necessary for an accounting event to be recognized. The framework goes on to outline the bases for measuring the cost or the value of economic events. However, as was established in chapter 6 and 7,

the characteristics of cost and value are not in harmony with the principles of the representational theory of measurement. They do not satisfy the criteria for measurability.

Furthermore, the characteristics of the bases (historical cost, current cost, realizable value, present value) of measuring value or cost in accounting are not in harmony with the principles of the representational theory of measurement. The analyses in chapters 3, 4, 5, 6, 9 and 10 also indicate that the principles of the accounting concept of measurement outlined in the IASB framework (2006) for the preparation and presentation of financial statements are not in harmony with the principles of the representational theory of measurement. This means that the accounting framework for financial reporting does not contain the principles of accounting measurement. Statement 1 tests whether accountants are aware that the framework of financial reporting does not contain genuine principles of accounting measurement. Table 12.1 shows the responses of the accountants to this statement.

Table 12.1: Statement 1

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	38	34.23	81.98
Agree	53	47.75	
Unsure	11	9.91	18.02
Disagree	7	6.31	
Strongly Disagree	2	1.80	
Total	111	100	100

The table indicates that 47.75 percent of chartered accountants agreed with statement 1 and 34.23 percent strongly agreed. The vast majority (81.98 %) of respondents are therefore in agreement with this statement. This suggests that the majority of chartered accountants view the accounting conceptual framework

as providing the foundations of accounting measurement. If this is the case it can be concluded that this majority is not aware that the accounting measurement prescriptions made under the accounting conceptual framework (IASB, 2006) are not consistent with the principles of the representational theory of measurement. Therefore, it can be concluded that the measurement beliefs of accountants that are reflected in the accounting practices of measurement are not only due to statutory requirements, but that they also reflect the true measurement views of accountants.

Statement 2: *Information is understandable and useful to users if it possesses the quality of meaningfulness.* The concept of understandability is one of the qualitative characteristics that financial statements should possess if they are to be considered useful to users. In chapter 1 it was noted that accounting is currently considered to be a measurement discipline. Luce and Narens (1994) point out that all measurement information must be meaningful, and that measurement information is meaningful if users understand the use to which the information may be put. This suggests that accounting information is understandable if the user knows the use to which the accounting information may be put. That is, the purpose of accounting measurement information must be specified. It must also carry a specific meaning under specific circumstances. In chapter 10 it was noted that measurement information carries a specific meaning under a specific set of circumstances. This measurement information is said to be invariant or meaningful under the circumstances. It follows that information is understandable to a user if this user understands what it represents, what its purpose is and what it may be used for. It was established in chapter 10 that the accounting information in financial statements is not meaningful. Statement 2 tests whether chartered accountants are aware that accounting information is understandable to users if it possesses the quality of meaningfulness. Table 12.2 reflects the responses to statement 2.

Table 12.2: Statement 2

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	42	37.84	93.7
Agree	62	55.86	
Unsure	3	2.70	6.3
Disagree	4	3.60	
Strongly Disagree	0	0	
Total	111	100	100

From table 12.2 it is clear that 37.84 percent of chartered accountants strongly agree with statement 2, while 55.86 percent agree with the statement. It follows that 93.7 percent of the respondents are therefore in agreement with this statement. This suggests that chartered accountants recognize the link between the measurement concept of meaningfulness and the qualitative characteristic of understandability. It can therefore be concluded from this survey that the majority of accountants are aware of this link. It can also be inferred that accountants are aware that users of accounting information need to understand the measurement procedures that accountants employ in measuring the attributes of accounting phenomena for this information to be useful to them. It follows that users must understand the production of accounting information for them to be able to understand its uses.

Statement 3: *Accounting information is relevant to the economic decision-making needs of the users if it is meaningful to the users.* Information is relevant to the economic decision-making needs of the user if its use in that particular economic decision-making situation is known. The user can only judge the relevance of measurement information to a decision-making situation if he or she knows the type of information that is relevant for that particular decision, and if he or she knows the uses of the information at hand and the purpose for which it has been produced. Narens (2002) points out that measurement information is meaningful if

the use to which the information may be put is known. Consequently, this viewpoint ties the measurement concept of meaningfulness to the relevance of accounting measurement information to the economic decision needs of the user.

This statement tests whether accountants are aware that accounting measurement information is relevant to economic decision-making needs of the user if it is meaningful to the user. Table 12.3 indicates the responses of chartered accountants to statement 3.

Table 12.3: Statement 3

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	41	36.94	96.4
Agree	66	59.46	
Unsure	1	0.90	3.6
Disagree	3	2.70	
Strongly Disagree	0	0	
Total	111	100	100

The table reflects that 59.46 percent of chartered accountants agree with statement 3, and 36.94 strongly agree: 96.40 percent of chartered accountants are therefore in agreement with statement 3. This indicates that the majority of chartered accountants are aware that accounting measurement information that is relevant to the decision-making needs of the user must also be compatible with the measurement concept of meaningfulness. This also suggests that accountants are aware that users must be familiar with accounting measurement procedures employed by accountants in producing accounting information so that they know whether the information produced is relevant to the economic decisions they are making.

Statement 4: *Reliable information is information that can be empirically verified*. In chapter 2 it was noted that reliable measurement information is information that is invariant. That is, all measurement information must be capable of being

empirically verified. Furthermore, Luce *et al*. (1971) state that a measure is supposed to represent the properties of an underlying empirical relational structure. This means that an analysis of a measurement should exhibit invariance that is appropriate to the structure underlying the measurement. It was noted in chapter 5 that accounting information is not reliable. It is also not empirically verifiable. According to Luce and Narens (1994), the concept of reliability is linked to the concept of invariance and meaningfulness. In other words, accounting information is not meaningful. This statement tests whether accountants are aware that all measurement information must be objective, invariant and meaningful. Table 12.4 highlights the views of chartered accountants with regard to statement 4.

Table 12.4: Statement 4

Rating Scale	Frequency	Percentage	Analysis of percentages
Strongly Agree	35	31.53	79.28
Agree	53	47.75	
Unsure	9	8.11	20.72
Disagree	14	12.61	
Strongly Disagree	0	0	
Total	111	100	100

Table 12.4 reflects that 31.53 percent of chartered accountants agree with statement 4 and 47.75 strongly agree with the statement. The majority (79.28 percent) are therefore in agreement with statement 4 suggesting the majority of chartered accountants is aware that reliable measurement information must be objective, invariant and meaningful. The information must retain its meaningfulness under different circumstances and users.

Statement 5: *The comparability of accounting information is possible when the conditions of comparability are specified.* According to Stevens (1951), measurement occurs under a specific set of circumstances. This means that

measurements can only be considered identical if they are produced under identical circumstances. It follows that if accounting information is measurement information, it can only be compared if it has been produced under identical circumstances. According to Stevens (1951), measurements are relative to the specific environment in which they have been produced. Different environments may produce different measures unless the measurement conditions are standardised. Conditions of comparability of measurements are specified when it is shown that measurements have been produced under identical conditions or when the conditions under which they *have been produced are adjusted so as to reflect identical circumstances (Luce et* al., 1990). This means that accounting information can only be compared if it has been produced under identical conditions or if the conditions are adjusted so as to reflect identical circumstances. It was established in chapter 9 that accounting information from different accounting periods and from different companies is frequently compared without specifying the conditions under which the information has been produced. It is necessary to specify the procedures used to elicit measurement information for it to be comparable. This statement tests whether accountants are aware that measurement information is comparable when it has been produced under identical circumstances. Table 12.5 reflects the responses of chartered accountants to statement 5.

Table 12.5: Statement 5

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	27	24.32	86.48
Agree	69	62.16	
Unsure	8	7.21	13.52
Disagree	7	6.31	
Strongly Disagree	0	0	
Total	33	100	100

The table shows that 62.16 percent of chartered accountants agree and 24.32 percent strongly agree with the statement: 86.48 percent of academic accountants therefore agree with statement 5. This suggests that the majority of chartered accountants are aware that measurement information is not comparable unless if it has been produced under an identical set of circumstances.

Discussion

The purpose of the statements in this section was to establish whether chartered accountants view the conceptual framework for financial reporting as a framework that genuinely outlines the foundations of accounting measurement, and to test whether chartered accountants are aware of the link between the qualitative characteristics of financial statements and the representational measurement concept of meaningfulness. The overall responses to the statements in this section indicate that accountants view the conceptual framework for financial reporting as one that outlines the foundations of accounting measurement and that the majority are aware of the link between the qualitative characteristics of financial statements and the measurement concept of meaningfulness.

It has been noted in this in study that the foundations of accounting measurement are not outlined in the accounting literature. In particular, Chambers (1997) notes that there are no specified scales of measurement in the accounting discipline. This suggests that chartered accountants are not aware that the accounting conceptual framework (IASB, 2006) does not outline the foundations of accounting measurement. The foundations that the accounting conceptual framework purports to specify are not in harmony with the principles of the representational theory of measurement.

With regard to the concept of meaningfulness, Narens (2002) points out that measurement information is meaningful once the scale of measurement has been specified. This suggests that no measurement information can be meaningful in the absence of a scale. Authors such as Chambers (1997), Willet (1987) and

Ryan *et al*. (2002) have noted that there are no specified scales of measurement in accounting. However, the responses in statement 1 indicate that chartered accountants believe that the accounting framework provides the foundations of accounting measurement when there are no specified scales of measurement. In other words, accountants do not appear to be familiar with the application of the concept of meaningfulness to measurement information. Consequently, this suggests that chartered accountants are not aware that the accounting conceptual framework (IASB, 2006) does not represent the foundations of accounting measurement. All that are referred to as foundations of accounting measurement are not in harmony with the principles of the representational theory of measurement. If accounting is to be considered a measurement discipline, it is necessary to develop principles of accounting measurement that reflect the measurement properties of this discipline.

Section 2: Measurement and the nature of accounting phenomena under the accounting conceptual framework

This section is designed to test whether accountants are aware of whether or not the nature of accounting phenomena under the current accounting conceptual framework is consistent with the principles of representational measurement. It has been noted in this study (Luce *et al*., 1971) that the empirical relational structure of a phenomenon and its empirical properties must be invariant. This means that the set of axioms leading to the representation and uniqueness theorems may be regarded as a set of qualitative empirical laws. In a measurement space, the empirical attributes must be specified. It is therefore necessary that the attributes of accounting phenomena that are of use and interest to measure should be specified. According to Decoene *et al*. (1995), before measurement can take place there must be a thorough understanding of the empirical relational structure. This means that it is necessary to a have a

thorough understanding of accounting phenomena before accounting measurement can take place.

It has been also noted in this study that the qualitative structures of accounting phenomena and their properties under the accounting conceptual framework are not invariant and are therefore not measurable according to the principles of representational measurement. Furthermore, it was remarked in chapter 6 that the attributes of accounting phenomena that are of use and interest to measure in the accounting discipline are not specified. The concept of measurement in accounting refers to the measurement of the qualities of the elements of financial statements (IASB, 2006). But, as mentioned in chapter 6, these elements do not have qualities that are measurable under the current accounting conceptual framework. Statements 6 to 10 test whether chartered accountants are aware of this.

Statement 6: *The future economic benefits that are expected to flow from an asset are measurable.* This statement tests whether accountants believe that under the IASB framework (2006) for financial reporting the future economic benefits that are expected to flow from an asset are measurable. The IASB (2006, Para 89) points out that an asset should be recognized in the balance sheet when it is probable that future economic benefits will flow to the entity from this asset. The use of the word “probable” implies that it is the expectation of future economic benefits whose properties have to be measured during recognition. Orbach (1978) points out that it is only expectations of future phenomena that are measurable. He also argues that expectations have legitimate properties in the present that are measurable. This means that the attributes of expectations exist in the present and they must be specified in order for them to measurable in the present. It follows that in the accounting literature (e.g., IASB, 2006) there are specified attributes for future economic benefits that are expected to flow from an asset. However, Chambers (1997) notes that the properties of accounting phenomena that are measurable are not currently specified in the accounting literature. This means that the properties of the expectations of future economic benefits that are

measurable under the current accounting conceptual framework are not known. However, every measurement process requires the specification of the attributes that are of use and interest to measure (Ryan *et al*., 2002). This suggests that the set of axioms that lead to the representation and uniqueness theorems in accounting measurement cannot be specified. It follows that the representation and uniqueness theorems that are fundamental to accounting measurement are not specified. As a result, the future economic benefits that are expected to flow from an asset are not currently measurable under the accounting conceptual framework. Table 12.6 reflects the views of chartered accountants.

Table 12.6: Statement 6

Rating Scale	Frequency	Percentage %	Analysis of Percentages
Strongly Agree	16	14.41	59.46
Agree	50	45.05	
Unsure	20	18.02	39.64
Disagree	24	21.62	
Strongly Disagree	1	0.90	
Total	111	100	100

It can be inferred from the table just over a third (39.64 percent) of chartered accountants disagree with the statement. This suggests that a significant proportion of chartered accountants are aware that under the current accounting conceptual framework (IASB, 2006) there are no specified attributes of accounting phenomena whose expectations can be measured. It can be concluded that approximately forty percent of chartered accountants are aware that the statutory financial reporting requirements are not in harmony with the principles of the representational theory of measurement.

The table also indicates that almost half (45.05 percent) the chartered accountants agree with statement 6 while 14.41 percent strongly agree. It follows

that 59.46 percent of the chartered accountants are therefore in agreement with statement 6. Therefore, the majority of chartered accountants are not aware that under the current accounting conceptual framework (IASB, 2006) there are no specified attributes of accounting phenomena whose expectations can be measured. It is clear from this survey that the majority of accountants are not aware that the future economic benefits that are expected to flow to a business entity are not measurable under the current accounting conceptual framework. In any measurement space, however, it is essential to specify the empirical attributes that are of use and interest to measure.

Statement 7: *Liabilities have measurable attributes.* This statement is designed to test whether accountants believe that liabilities have specified measurable attributes under the current accounting conceptual framework. In chapter 6 it was established that a liability does not have a precise definition under the IASB framework (2006) for financial reporting. This means that the properties of liabilities that can be empirically tested are not currently specified in the accounting literature. Authors such as Willet (1987), Staubus (2004) and Chambers (1997), note that liabilities do not have a precise definition, nor do they have any specified attributes that may be measured. The measurement axioms that lead to the representation and uniqueness theorems of measurement can be specified only once the object of measurement has been specified. Therefore, this suggests that the measurement axioms that lead to the representation and uniqueness theorems of accounting measurements of the attributes of liabilities cannot be specified. Table 12.7 reflects the views of the chartered accountants on statement 7.

Table 12.7: Statement 7

Rating Scale	Frequency	Percentage %	Analysis of Percentages
Strongly Agree	14	12.61	79.28
Agree	74	66.67	
Unsure	16	14.41	20.72
Disagree	7	6.31	
Strongly Disagree	0	0	
Total	111	100	100

The results in table 12.7 indicate that 66.67 percent of chartered accountants agree with statement 7 while 12.61 percent strongly agree. It can therefore be concluded that 79.28 percent of the chartered accountants are in agreement with the statement. It is clear from this survey that the majority of chartered accountants are not aware that liabilities have no measurable attributes under the current (IASB, 2006) accounting conceptual framework. It can also be concluded the majority of accountants is not aware that it is necessary to specify the object of measurement. In chapter 2 it was stressed that it is not possible to measure an unknown object. Therefore, the attributes of liabilities must be known before they can be measured.

Statement 8: *Under the accounting conceptual framework it is possible to measure the income generated by an entity in a particular accounting period.* This statement tests whether accountants believe that periodic income is measurable under the current accounting conceptual framework. Income is considered an ambiguous concept that is not an intrinsic property of an accounting entity (Stamp, 1981). This suggests that the qualitative structure of income and its properties cannot be considered to be invariant. The properties of income are dependent on the opinion of the accountant. As a result, the representation and uniqueness theorems cannot be proved on the axioms leading to the measurement of the attributes of income.

According to Luce and Narens (1994), proving the representation and uniqueness theorems is equivalent to specifying the scale of measurement. This means that the property that is being measured must be known for a scale of measurement to be specified. If the representation and uniqueness theorems cannot be proved on the measurement of income, it follows that under the representational theory of measurement a statistical analysis of the measurements that are supposed to represent the attributes of income cannot give a result that exhibits invariance appropriate to the structure underlying the measurements. The structure underlying the abstract structures is thus not known. Consequently, the truth or falsity of the representations by the abstract structures is not known. Thus, it is argued that the attributes of income are not measurable. Table 12.8 reflects the views of the chartered accountants on this statement.

Table 12.8: Statement 8

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	28	25.23	91.90
Agree	74	66.67	
Unsure	5	4.50	8.10
Disagree	4	3.60	
Strongly Disagree	0	0	
Total	111	100	100

It is clear from table 12.8 that 66.67 percent of chartered accountants agree with statement 8 and 25.23 percent strongly agree. In other words, 91.90 percent of chartered accountants are therefore in agreement with the statement. This suggests that the majority of chartered accountants are not aware that income has no measurable attributes under the current accounting conceptual framework. Its empirical relational structure cannot be specified. This means that the attributes of income that are measurable are not known. In chapter 2 it was noted that before measurement can take place it is necessary to specify the empirical

relational structure of the phenomenon to be measured. Therefore, it can be concluded that the majority of accountants is not aware that measurement cannot take place in the absence of a specified empirical relational structure.

Statement 9: *The attributes of expenses are measurable.* This statement is designed to test whether accountants believe that expenses have attributes that are currently measurable under the current accounting conceptual framework. Chambers (1997) notes that accounting literature has not specified the attributes that are of use and interest to measure in the accounting discipline. This suggests that expenses currently have no specified attributes that are of use and interest to measure. It was also established in chapter 6 that expenses do not have measurable attributes under the current accounting conceptual framework. This is because currently expenses do not have specified relational structures under the accounting conceptual framework. This means that the attributes of expenses that are measurable are not known. But, in chapter 2 the point was made that in a measurement space it is necessary to specify the empirical relational structure and the empirical attributes that are of use and interest to measure (Luce *et al*., 1971). This suggests that expenses do not currently have specified measurement spaces under the IASB framework (2006) for financial reporting. Table 12.9 indicates the views of the chartered accountants.

Table 12.9: Statement 9

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	18	16.22	85.59
Agree	77	69.37	
Unsure	12	10.81	14.41
Disagree	3	2.70	
Strongly Disagree	1	0.90	
Total	111	100	100

The table demonstrates that 69.37 percent of chartered accountants agree with statement 9 and 16.22 percent strongly agree. Therefore, 85.59 percent of chartered accountants are in agreement with statement 9. This suggests that most chartered accountants are not aware that expenses have no specified attributes that are measurable under the current accounting conceptual framework. Consequently, it can be concluded that accountants are not aware that it is necessary to specify the attributes that are the subject of measurement before measurement can take place.

Statement 10: *It is possible to measure the attributes of future events.* This statement tests whether accountants believe that it is possible to measure a phenomenon that does not exist. It should be pointed out that all measurements are made at a point in time and the purpose of the measurement is to discover the magnitude at that point in time, without regard to what has gone before or what will come after that point (Sterling, 1979). This means that something that is in the future is not measurable in the present. Only the expectations of future events are measurable in the present. Orbach (1978) points out that, expectations have legitimate properties that are measurable in the present. Thus, it can be argued that the attributes of future events are not measurable in the present. Table 12.10 reflects the views of the chartered accountants.

Table 12.10: Statement 10

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	4	3.60	41.44
Agree	42	37.84	
Unsure	30	27.03	27.03
Disagree	32	28.83	31.53
Strongly Disagree	3	2.70	
Total	111	100	100

Table 12.10 reflects that 37.84 percent of chartered accountants agree with statement 10 and 3.60 percent of them strongly agree with it. A small percentage (27.03 percent) of the chartered accountants is not sure whether or not to agree with the statement. It should be noted that the respondents who agreed, disagreed and were unsure are classified as having responded positively to a statement that required a negative response. As a result, the analysis of the percentage responses classifies these responses as having responded in the same way. The table also indicates that a significant proportion of chartered accountants (31.53 %) is also aware that the attributes of future events are not measurable in the present. This reveals a debate in the accounting discipline on what is measurable and what is not. Nevertheless, it is clear that the proportion of accountants who are aware that phenomena that do not exist are not measurable is smaller than that which believes that non-existent phenomena are measurable. Therefore, it follows that the majority of chartered accountants are therefore not aware that it is not possible to measure a phenomenon that does not exist. It can therefore be concluded that accountants are not familiar with the principles of representational measurement that require (see, chapter 2) that the phenomena that are the subject of measurement must be empirically testable.

Discussion

The purpose of the statements in this section has been to establish whether accountants are aware that, under the current conceptual framework, accounting phenomena do not have measurable attributes. The concept of measurement is normally applied to an abstraction of facts from a given situation. Currently, the accounting conceptual framework requires that an element of the financial statement should have a cost or value that is measurable with reliability before it can be recognized in the financial statement. However, value is not currently measurable under the accounting conceptual framework. This means that the information about value that should be abstracted currently from the attributes of the elements of financial statements has no measurable attributes. As outlined earlier (Stevens, 1951), measurement is more immediately the goal of the

experimental corner where the patient sifting of facts and relations has disentangled some of the relevant variables. This means that the individuals doing the measurement must be able to identify the attributes that they are measuring.

In chapter 6 it was noted that there are no specified attributes of the elements of financial statements that are measurable. If this is the case, it can be inferred that the accounting discipline has not disentangled any relevant measurable variables of these elements of financial statements. This section tested whether accountants are aware that the elements of the financial statements do not have measurable attributes under the current IASB (2006) accounting conceptual framework for financial reporting. Chartered accountants are generally not aware that the elements of financial statements do not currently have measurable attributes under the present accounting conceptual framework. This suggests that chartered accountants are not familiar with the application of the principles of the representational theory of measurement.

Section 3: Measurement and the recognition of accounting phenomena

This section was designed to test whether accountants are aware that the rules for recognizing the elements of financial statements are not consistent with the principles of representational measurement. As was discussed in chapter 7, the rules for recognizing the elements of financial statements are not in harmony with the principles of representational measurement. The IASB framework (2006) for financial reporting points out that measurement of the value or cost of an item that meets the definition of an element is necessary for recognition of that item in the financial statement to occur. This viewpoint highlights that the measurement of cost or value is fundamental to the preparation of financial statements. It follows that without the measurement of cost or value no financial statements can be prepared. In chapter 7, it was noted that the accounting discipline has not yet recognized the distinction between the domain of the measurement function, the measurement function and the value of that measurement function. In particular,

cost is referred to in some instances as the domain of the measurement function and in others as its value. It was also noted in chapter 6 that value does not have attributes that are measurable. Value has not been precisely defined in the accounting literature. Luce *et al*. (1971) points out that it is necessary to define precisely an empirical relational structure before measurement can take place. This lack of a clear definition of the concepts of cost and value makes them immeasurable. In a measurement space, a precise knowledge of the objects of measurement is essential. Statements 11 to 15 test whether accountants are aware that the principles for recognizing the items that meet the definition of elements of financial statements are not in harmony with the principles of representational measurement.

Statement 11: *An item that meets the definition of an element of financial statements should be recognized if the item has a cost or value that can be measured with reliability.* This statement tests whether accountants believe that under the current IASB framework (2006) for financial reporting items that meet the definition of an element of the financial statement and that are recognized in the financial statement have a cost or value that can be measured with reliability. It was established in chapters 6 and 7 that the cost or the value of an element of a financial statement is not currently measurable under the accounting conceptual framework. If the principles of the representational theory of measurement were being followed under the IASB framework (2006) for financial reporting it would not be possible to recognize a single economic event in the financial statements since cost and value are not currently measurable.

Accountants are currently preparing financial statements (annual reports are published each year), but cost and value are currently not measurable. This raises the question of whether accountants are aware that they are currently recognizing items that meet the definition of an element of the financial statement, but these items do not have a cost or value that is currently measurable. Table 13.11 reflects the views of the chartered accountants on this statement.

Table 12.11: Statement 11

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	42	37.85	91
Agree	59	53.15	
Unsure	4	3.60	9
Disagree	4	3.60	
Strongly Disagree	2	1.8	
Total	111	100	100

Table 12.11 reflects that 53.15 percent of chartered accountants strongly agree with statement 11 while 37.84 percent agree with the statement. Therefore, 91 percent of chartered accountants are in agreement with the statement. This suggests that the majority of chartered accountants is not aware that the prescription by the IASB framework (2006) for financial reporting that an item that meets the definition of an element of financial statements should be recognized if the item has a cost or value that can be measured with reliability is currently false. Accountants are currently recognizing economic events that do not have a cost or value that is measurable. This indicates that accountants are not aware that cost and value are currently not measurable.

Statement 12: *Valuation is a process that is similar to measurement.* This statement is designed to test whether accountants believe that the process of valuation is similar to measurement. In chapter 6 it was established that the process of valuation is not a process of measurement. Goldberg (2001) points out that value reflects the personal desires of an individual. In other words, value is a subjective concept. This suggests that the processes of determining value are also subjective. In chapter 2 it was noted that the process of measurement must be an empirically verifiable process. This also implies that the process of valuation is not a process of measurement. Table 12.12 reflects the views of chartered accountants on statement 12.

Table 12.12: Statement 12

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	17	15.32	63.97
Agree	54	48.65	
Unsure	11	9.91	36.04
Disagree	23	20.72	
Strongly Disagree	6	5.41	
Total	111	100	100

In table 12.12 it is clear that 48.65 percent of chartered accountants agree with statement 12 and 15.32 percent of academic chartered accountants strongly agree. Therefore, 63.97 percent of chartered accountants – the majority – are not aware that valuation is a process that is not similar to measurement. This indicates that the majority of accountants cannot distinguish a process of valuation from a process of measurement. It can be inferred from this that the majority of accountants are not familiar with the process of measurement and that they are currently not performing the process of measurement in accounting.

Statement 13: *Value determinations continually refer to future states (Smith, 1956:116).* This statement tests whether accountants believe that value determination processes are focused on the future. It was established in chapter 6 that value determinations involve an estimation of future quantities. All measurements occur at a specific point in time and the purpose of the measurement is to discover the magnitude at that point in time, regardless of what has gone before or what will come after that point in time (Sterling, 1979). This indicates that measurement occurs only in the present. Goldberg (2001) points out that it is not possible to forecast with precision the future states of value. Value determinations are thus an attempt to predict the future and cannot therefore be empirically verified: they are dependent on assumptions that cannot be empirically verified. Consequently, value determinations are not processes of measurement. Table 12.13 reflects the views of chartered accountants on this statement.

Table 12.13: Statement 13

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	17	15.32	59.46
Agree	49	44.14	
Unsure	22	19.82	40.54
Disagree	19	17.12	
Strongly Disagree	4	3.60	
Total	111	100	100

From table 12.13 it is clear that 44.14 percent of chartered accountants agree with statement 13 and 15.32 percent strongly agree. It can be inferred that 59.46 percent of chartered accountants are therefore in agreement with statement 13. This suggests that the majority of academic accountants is aware that value is not a present-oriented phenomenon but a future-oriented phenomenon. However, a significant proportion {Unsure +Disagree + Strongly Disagree) of chartered accountants, that is 40.54 percent, is not aware that the processes of determining value are focused on the future. Sterling (1979) points out that processes that are focused on the future are forecasting processes. He argues that processes of forecasting lead to the production of forecasts and not to measurements. This suggests that a significant proportion of chartered accountants is aware that the process of determining value is a forecasting process.

Statement 14: *Historical cost basis, current cost basis, realisable value basis and the present value basis are theories of measuring value.* This statement tests whether accountants believe that the bases of accounting measurement, outlined in the accounting conceptual framework (IASB, 2006), that are employed in recognizing the items that meet the definition of an element of financial statements are theories of measurement. Orbach (1978), notes that historical cost and current cost are neither bases nor theories of measurement. It was established in chapter 6 that these bases of accounting measurement are not in harmony with the principles of the representational theory of measurement. Table 12.14 reflects the views of chartered accountants on this statement.

Table 12.14: Statement 14

Rating Scale	Frequency	Percentage	Analysis of percentages
Strongly Agree	27	24.32	92.79
Agree	76	68.47	
Unsure	1	0.90	7.21
Disagree	7	6.31	
Strongly Disagree	0	0	
Total	111	100	100

Table 12.14 reveals that 68.47 percent of chartered accountants agree with statement 14 while 24.32 percent strongly agree. The great majority (92.79 percent) of chartered accountants is therefore in agreement with statement 14. This suggests that the majority of chartered accountants are not aware that the bases of accounting measurement are not theories of measurement. It can therefore be concluded that accountants are not familiar with the principles of representational measurement and that they cannot establish whether or not a particular numerical assignment leads to measurement.

Statement 15: *The amount of monetary units paid to acquire a commodity is a measure of its value.* This statement tests whether accountants believe that the amount of monetary units assigned to a commodity or an element of the financial statement is a measure of its value. As has been noted earlier in this study (Ryan *et al*. 2002), the relationship between the amount of monetary units paid to acquire a commodity and its value is not known. Luce *et al*. (1971) point out that for measurement to occur the relationship between the empirical relational structure and the numerical relational structure must be known. Therefore, if the relationship between monetary units and value is not known, monetary units cannot be a measure of value. Table 12.15 reflects the views of the chartered accountants on statement 15.

Table 12.15: Statement 15

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	20	18.02	69.37
Agree	57	51.35	
Unsure	10	9.01	30.63
Disagree	20	18.02	
Strongly Disagree	4	3.60	
Total	111	100	100

Table 12.15 reflects that 51.35 percent of chartered accountants agree with statement 15 and 18.02 percent strongly agree. Therefore, 69.37 percent of chartered accountants are in agreement with statement 15. This suggests that the majority of chartered accountants is not aware that the amount of monetary units assigned to a commodity or an element of the financial statement is not a measure of its value. In chapter 6 it was mentioned that the relationship between the empirical relational structure and the numerical relational structure must be known for measurement to occur. This suggests that accountants are not familiar with the principles of measurement.

Discussion

The purpose of this section has been to establish whether accountants are aware that the principles for recognizing the elements of financial statements are not in harmony with the principles of the representational theory of measurement. Currently, the accounting conceptual framework (IASB, 2006) requires that an item that meets the definition of an element of financial statements should be recognized in the financial statements if it has a cost or value that can be measured with reliability. Yet there is no precise definition of the concept of value or cost. The responses to the statements in this section suggest that accountants are not aware that value or cost has no precise definition and, as a result, value or cost is not measurable.

It should be pointed out that the responses to this section indicate that accountants are not aware that the accounting principles of recognizing the elements of financial statements in financial statements are not in harmony with the principles of the representational theory of measurement.

Section 4: The integrity of accounting information created under the accounting conceptual framework

This section is designed to test whether accountants are aware that accounting measurement information is not empirically testable. All measurements must be objective. The concept of objectivity in measurement is linked to the concept of invariance. According to Stevens (1951), invariance is defined as changelessness in the midst of change, permanence in a world of flux, the persistence of configurations that remain the same despite the swirl and stress of countless hosts of curious transformations. Measurements must not change with the opinion of the observer. Measurements must mean the same thing irrespective of the change in circumstances. In representational measurement an empirical relational structure is represented by an abstract structure. In this case, the abstract structure must exhibit the same properties as the empirical relational structure. It follows that the statistical analysis of measurements must exhibit invariance appropriate to the structure underlying the measurements. In chapter 8 it was established that accounting measurement information is not objective. The statements in this section test whether accountants are aware that accounting measurement information is not objective.

Statement 16: *Future events do not represent reality.* This statement is designed to test whether accountants are aware that the attributes of future events do not represent reality and are therefore not measurable. Sterling (1979) points out that measurement occurs in the present and that the attributes of future events are not measurable. It was also established in chapter 5 that the attributes of future events are not measurable. It is only the expectations of the attributes of future

events that have legitimate properties in the present that are measurable. Table 12.16 reflects the views of chartered accountants on statement 16.

Table 12.16: Statement 16

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	11	10.09	44.77
Agree	38	34.86	
Unsure	24	22.02	57.69
Disagree	32	29.36	
Strongly Disagree	4	3.67	
Total	109	100	100

Frequency missing = 2

It is clear from the table 12.16 that 32 percent of chartered accountants disagree with statement 16 and 22.02 percent are not sure whether to agree or disagree with the statement. A small percentage (3.67 percent) strongly agrees with the statement. It follows that 57.69 percent of chartered accountants are not aware that the attributes of future events do not represent reality and are therefore not measurable. It follows that the majority of accountants are unaware of what is measurable and what is not in accounting. This suggests that the majority of accountants are not familiar with the principles of representational measurement. The table also reveals that 44.77 percent of chartered accountants agree with statement 16. This highlights the point that a significant proportion of chartered accountants are aware that future events have not happened yet and as a result they do not represent reality. In chapter 2 it was noted that it is only the attributes of empirical phenomena that are measurable. It follows, then, that a significant proportion of chartered accountants is aware that the attributes of future events are not empirical and are therefore not measurable.

Statement 17: *Estimates in accounting reflect measurements of the attributes of economic transactions.* This statement tests whether accountants believe that

estimates are measurements. As was established in chapter 5, estimates are not measurements, although the accounting literature classifies them as such. In chapter 2 it was noted that all measurements must be capable of being empirically verified. Sterling (1979) also points out that estimates are not measurements. This is because estimates are not empirically verifiable. However, the IASB framework (2006) for financial reporting refers to estimates as measurements. This indicates that the principles that guide financial reporting hold that estimates and measurements are identical. This statement tests whether accountants are aware that estimates are incorrectly referred to as measurements in the accounting discipline. Table 12.17 reflects the views of the chartered accountants.

Table 12.17: Statement 17

Rating Scale	Frequency	Percentage %	Analysis of percentages%
Strongly Agree	8	7.21	74.78
Agree	75	67.57	
Unsure	20	18.02	25.23
Disagree	8	7.21	
Strongly Disagree	0	0	
Total	111	100	100

The table above indicates that 67.57 percent of chartered accountants agree with statement 17 and 7.21 percent strongly agree. That is, 74.78 percent of academic chartered accountants are in agreement with the statement. This suggests that chartered accountants are not aware that estimates are not measurements. It can be inferred from this that the majority of accountants are not able to distinguish between the processes that give rise to measurements and those that do not. Therefore, it can be concluded that accountants are not familiar with the principles of measurement.

Statement 18: *Accrual accounting is mainly concerned with the measurement of the attributes of future accounting phenomena.* This statement tests whether

accountants believe that the attributes of future accounting phenomena are currently being measured under the accrual concept. According to Goldberg (2001:95), the cash basis of accounting does not portray an accurate measure of net financial results from periodical business activity. The accrual notion is applied as a remedy by bringing to account in a given period any deferred or expected elements of revenue or outlay which could be rationally viewed as appropriate to the period under review, even though the cash impact would be felt in some other period. This highlights the point that the notion of accrual is focused on the quantification of future happenings that are expected to have an impact on the current accounting period. Accrual accounting is thus concerned with the measurement of the current effects of future phenomena. Sterling (1979) points out that all measurements are made at a point in time regardless of what has happened before or of what happens after that point. This suggests that the accrual concept of accounting measurement is not measurement after all, nor is it in harmony with the principles of representational measurement. Table 12.18 reflects the views of the chartered accountants on this statement.

Table 12.18: Statement 18

Rating Scale	Frequency	Percentage %	Analysis of percentages%
Strongly Agree	5	4.50	30.63
Agree	29	26.13	
Unsure	17	15.32	69.38
Disagree	52	46.85	
Strongly Disagree	8	7.21	
Total	111	100	100

The table above reflects that 46.85 percent of chartered accountants disagree with statement 18 while 7.21 percent of chartered accountants strongly disagree with it. Furthermore, 15.32 percent of accountants are not sure whether or not to agree with this statement. Therefore, it follows that 69.38 percent of the chartered accountants are in disagreement with statement 18. This suggests that the majority of chartered accountants are not aware that the concepts of accrual

accounting are not consistent with the principles of the representational theory of measurement.

Statement 19: *Income is an ambiguous concept that is not an intrinsic property of an accounting entity (Stamp, 1981).* This statement tests whether accountants are aware that the qualitative structure of income cannot be empirically verified. As was established in chapter 6, the concept of income is dependent on the opinion of the individual. Luce *et al*. (1971) point out that objects of measurement must be empirically testable. Consequently, this means that income is not measurable. Only empirically verifiable phenomena are measurable. Table 12.19 indicates the views of chartered accountants about this statement.

Table 12.19: Statement 19

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	7	6.31	18.92
Agree	14	12.61	
Unsure	23	20.72	81.08
Disagree	59	53.15	
Strongly Disagree	8	7.21	
Total	111	100	100

The table reflects that 53.15 percent of chartered accountants disagree with statement 19 and 7.21 percent strongly disagree with it. Furthermore, 20.72 percent of chartered accountants are unsure about whether or not statement 19 is true. In other words, 81.08 percent of chartered accountants are in disagreement with the statement. Therefore, the majority of chartered accountants are not aware that income is an ambiguous concept that is not an intrinsic property of an accounting entity. This suggests that accountants are not aware that income is not measurable.

Statement 20*: Value is an ambiguous concept and it is not an intrinsic property of an accounting entity (Stamp, 1981).* This statement tests whether accountants are

aware that value is not an empirical property of an accounting entity. In chapter 6 it was noted that the concept of value lacks a precise definition, and as a result it cannot be considered to be a measurable property of an accounting entity. It follows that accounting information about value cannot be considered to be verifiable empirical information. In chapter 2 it was established that only empirical phenomena are measurable. This means that accounting value is not measurable. Table 12.20 reflects the views of chartered accountants on statement 20.

Table 12.20: Statement 20

Rating Scale	Frequency	Percentage %	Analysis of percentages%
Strongly Agree	12	10.81	39.64
Agree	32	28.83	
Unsure	19	17.12	60.44
Disagree	44	39.64	
Strongly Disagree	4	3.60	
Total	111	100	100

The table shows that 39.64 percent of chartered accountants disagree with statement 20 and 3.60 percent of the chartered accountants strongly disagree with it. A small percentage (17.12 percent) is not sure whether or not to disagree with the statement. In total, 60.44 percent of chartered accountants are in disagreement with the statement. It is also clear from the table that 39.64 % of respondents are in agreement with the statement. This proportion can be considered to be significant in relation to the overall study. It can be inferred from this that there is an ongoing debate in accounting on whether or not value is empirical. However, the overall response suggests that accountants are not aware that value is an ambiguous concept and not an intrinsic property of an accounting

entity (phenomenon). It follows that the majority of accountants are not aware that value is not measurable.

Statement 21: *The attributes of accounting phenomena are dependent on the judgement of the accountant.* This statement tests whether accountants are aware that the attributes of accounting phenomena that are of use and interest to measure under the accounting conceptual framework cannot be objectively determined. It was established in chapter 7 that the existence of the attributes of accounting phenomena that are of interest to measure in accounting depends on the intuition of the accountant. The accounting framework (IASB, 2006) specifies the attributes of accounting phenomena that are of use and interest to measure as value or cost. In chapter 6 it was noted that value is ambiguous and does not have a precise definition. In chapter 7 it was established that the concept of cost is not precisely defined. This indicates that both cost and value are ambiguous and cannot be precisely identified. Table 12.21 reflects the views of chartered accountants on statement 21.

Table 12.21: Statement 21

Rating Scale	Frequency	Percentage %	Analysis of percentages%
Strongly Agree	8	7.21	57.66
Agree	56	50.45	
Unsure	10	9.01	42.34
Disagree	35	31.53	
Strongly Disagree	2	1.80	
Total	111	100	100

The table reflects that 50.45 percent of chartered accountants agree with statement 21 while 7.21 percent strongly agree. A total of 57.66 percent of chartered accountants are therefore in agreement with the statement. This figure suggests that the majority of accountants are aware that the attributes of accounting phenomena cannot be objectively determined. The table also indicates

that 42.34 percent of chartered accountants are not in agreement with statement 21. This indicates that a significant proportion of chartered accountants are not aware that the characteristics of accounting phenomena are dependent on the opinion of the accountant. It follows that a significant proportion of chartered accountants is not familiar with the characteristics of the objects of measurement in accounting. It can therefore be concluded that a significant proportion of accountants should be educated about the principles of measurement.

Statement 22: *Value is whatever two people are willing to trade for.* This statement is designed to test whether accountants are aware that the concept of value is unique to a specific economic transaction. Tinker (1985) points out that value is socially constructed. This suggests that value is dependent on specific circumstances of an economic transaction. In chapter 6 it was established that value cannot be empirically verified. As a result, the concept of value cannot be common to all economic transactions. Table 12.22 reflects the responses of chartered accountants to this statement.

Table 12.22: Statement 22

Rating Scale	Frequency	Percentage %	Analysis of percentages%
Strongly Agree	24	21.62	61.26
Agree	44	39.64	
Unsure	9	8.11	38.74
Disagree	33	29.73	
Strongly Disagree	1	0.90	
Total	111	100	100

The table reveals that 39.64 percent of chartered accountants agree with statement 22 while 21.62 percent strongly agree with it. More than half (61.26 percent) of chartered accountants are therefore in agreement with the statement. This suggests that accountants are aware that value is dependent on particular circumstances and is therefore subjective.

Discussion

This section was designed to test whether accountants are aware that accounting information in financial statements is not objective. The phenomena that this information is meant to describe are subjective. In measurement literature the properties of the empirical relational structure that are described by measurement information are supposed to be empirically testable. The responses of the accountants in this section reveal that they are not aware that measurement information represents objectively existing entities. Their responses also indicate that they are not aware that the phenomena that are commonly referred to as capable of being measured (e.g., income, value) in the accounting literature are in fact not objectively determinable phenomena. It can further be inferred from these responses that accountants are not aware of the difference between estimates and measurements. This discussion indicates that accountants do not have adequate knowledge about the principles of measurement. As a result, they are not aware of the difference between measurements and quantifications that are not measurements. Their lack of measurement knowledge makes accountants uncertain as to whether or not accounting is a measurement discipline.

Section 5: Measurement and the concept of time under the accounting conceptual framework

This section tests whether accountants are aware that the concept of time in accounting distinguishes between measurements and numerical quantifications that are not measurements. All measurements are made at a specific point in time. It has been established in this study (Sterling, 1968) that the purpose of a measurement is to discover the magnitude at a point in time without regard to what has gone before or what will come after that point. This suggests that measurement only occurs in the present.

The IASB framework (2006) for financial reporting points out that financial statements are usually prepared on the assumption that an entity is a going concern and will continue in operation for the foreseeable future. For this reason it

is assumed that the firm has neither the intention nor the need to liquidate or curtail materially the scale of its operations. If such an intention or need exists the financial statements may be prepared on a different basis and that basis has to be disclosed (IASB, 2006). It can be inferred from this that, currently, accounting measurement usually takes place under going concern. It follows that when accountants talk about accounting measurement, they are referring to measurement under the going concern assumption. If however, as outlined above, all measurements are made at a specific point in time, then it is not possible for measurement to take place under the going concern assumption. Sterling (1968) points out that the statements prepared under the going concern concept are provisional; it requires the liquidation case before final accurate statements can be prepared. This suggests that financial statements prepared under going concern do not represent measurement information.

It was also established in chapter 5 and chapter 9 that the way financial statements are prepared under the going concern assumption is not compatible with the principles of the representational theory of measurement. This section tests whether accountants are aware that measurement is not possible under the going concern assumption.

Statement 23: *The going concern assumption is necessary for accounting measurement to occur.* This statement tests whether accountants believe that the going concern assumption is necessary for accounting measurement. As has been established in chapter 5, the going concern assumption continually refers to future states. Sterling (1968) points out that the statements prepared under going concern are dependent on subsequent events for their confirmation. This means that all accounting magnitudes under the going concern are dependent on subsequent events for their empirical testability. Sterling (1979) also highlights that the purpose of measurement is to discover the magnitude at that point in time without regard to what has gone before or what will come afterwards. This indicates that measurement cannot occur under going concern. Table 12.23 reflects the views of the chartered accountants on this statement.

Table 12.23: Statement 23

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	23	20.72	58.56
Agree	42	37.84	
Unsure	8	7.21	41.44
Disagree	29	26.13	
Strongly Disagree	9	8.11	
Total	111	100	100

The table indicates that 37.84 percent of chartered accountants agree with statement 23 and 20.72 percent strongly agree with it. Therefore, 58.56 percent of chartered accountants are not aware that no accounting measurement occurs under the going concern assumption. Consequently, it follows that the majority of accountants are not aware that the going concern assumption is not necessary for accounting measurement to occur.

The table also indicates that 41.44 percent of chartered accountants do not agree with statement 23. This indicates that a significant proportion of chartered accountants do not believe that the going concern assumption is necessary for accounting measurement to occur. It follows then that a significant proportion of chartered accountants is aware that no measurement occurs under going concern.

Statement 24: *It is possible to measure periodic income under the going concern assumption.* This statement tests whether accountants believe that income is measurable under going concern. Sterling (1968), notes that the income from a business is not measurable during its lifetime, except at liquidation. This means that measures of periodic income are provisional. Sterling (1979) adds that all measurements are made at a specific point in time. This suggests that no phenomenon is measurable under going concern, as statements made under going concern are dependent on subsequent events. Income always lies in the future under the going concern assumption. Goldberg (2001) points out that

accounting events flow through a business during its lifetime. This means that in order to measure periodic income during the lifetime of a business, business has to be stopped so that the income can be measured. But, if business activities were stopped in order to measure income, the concept of flowing activities would not be true. Table 12.24 reflects the views of chartered accountants on this issue.

Table 12.24: Statement 24

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	12	10.81	82.88
Agree	80	72.07	
Unsure	15	13.51	17.11
Disagree	4	3.60	
Strongly Disagree	0	0	
Total	111	100	100

The table above indicates that 72.07 percent of chartered accountants agree with statement 24 and 10.81 percent strongly agree: 82.88 percent of chartered accountants are therefore in agreement with the statement. This suggests that chartered accountants are not aware that periodic income is not currently measurable under the going concern assumption. In chapter 6 it was noted that periodic income is not measurable. Therefore, it can be concluded that the majority of chartered are not aware that periodic income is not measurable.

Statement 25: *Under the going concern assumption the statement of financial position reflects true measurements of the attributes of assets and liabilities.* This statement tests whether accountants believe that the balance sheet reflects measurements of the attributes of assets and liabilities. Willet (1987) notes that no property is currently being measured in the accounting discipline apart from the numerosity of monetary units. He argues that it is not known exactly what the monetary units represent in accounting. This indicates that it is not known what

aspect of assets and liabilities the monetary units represent. Ryan *et al*. (2002) also point out that the relationship between value and monetary units is not known with certainty. This means that monetary units cannot be considered invariant in terms of the underlying structure of value. Consequently, a balance sheet cannot contain measurements of the attributes of assets and liabilities. Table 12.25 reflects the views of the chartered accountants on this statement.

Table 12.25: Statement 25

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	13	11.71	62.16
Agree	56	50.45	
Unsure	12	10.81	37.84
Disagree	28	25.23	
Strongly Disagree	2	1.80	
Total	111	100	100

The table reveals that 50.45 percent of chartered accountants agree with statement 25 and 11.71 percent strongly agree with it. It follows that 62.16 percent of chartered accountants are in agreement with the statement. Therefore, the majority of chartered accountants are not aware that the balance sheet does not contain measurements of the attributes of assets and liabilities. In chapter 6 it was established that value is currently not measurable in the accounting discipline. Consequently, it can be inferred from this that accountants are not aware that value is currently not measurable in accounting.

Statement 26: *The valuation of assets and liabilities can only occur under the going concern assumption.* This statement tests whether accountants are aware that the valuation of assets and liabilities can only occur under the going concern assumption. Smith (1956) notes that value determinations continually refer to future states. This means that the present concept of value is dependent on subsequent events. Sterling (1979) also points out that subsequent events always

lie in the future. This suggests that subsequent events can never be known. The going concern assumption is necessary for the future benefit theory in the valuation of assets and liabilities. Assets are values in terms of the expected future economic benefits that flow into or out of the firm respectively. This means that the firm has to exist in the future in order to receive the benefits. Table 12.26 reflects the views of chartered accountants.

Table 12.26: Statement 26

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	3	2.70	27.03
Agree	19	17.12	
Unsure	8	7.21	
Disagree	60	54.05	72.97
Strongly Disagree	21	18.92	
Total	111	100	100

It is evident from this table that 54.05 percent of chartered accountants disagree with statement 26 while 18.92 percent strongly disagree. In other words, 72.97 percent of chartered accountants disagree with statement 26. This suggests that chartered accountants are not aware that the valuation of assets and liabilities can only occur under the going concern assumption. It follows that accountants are not aware of the importance to accounting of the going concern assumption. In chapter 5 it was established that the preparation of financial statements for a company that is expected to continue for the foreseeable future should be prepared under going concern. This would not be possible without the going concern assumption.

Statement 27: *The values of assets can be meaningfully added to each other in the balance sheet.* This statement tests whether accountants believe that the values of assets can be meaningfully added to each other in the balance sheet. The IASB framework (2006) for financial reporting indicates that an item that

meets the definition of an element of the financial statements should be recognized in the financial statement if it has a value that can be measured with reliability in monetary terms. This means that assets and liabilities that are recognized in the balance sheet are believed to have a cost or value that is measurable. As noted in chapter 6, value is an ambiguous concept, and as a result is not currently measurable. But, according to Stevens (1951), all phenomena that are measurable must be empirical. This suggests that value cannot be empirically verified. This means that the monetary units used to represent the values of assets and liabilities are not measures of value. Willet (1987) claims that it is not known exactly what monetary units represent in accounting. It can be inferred from this that monetary units are related to value by unknown psychological laws. Measurements can only be added to each other if it can be shown that they are not structurally different. Therefore, if the relationship between value and monetary units is not known, it is not possible to determine whether monetary units representing the values of different assets are structurally identical. Table 12.27 reflects the views of chartered accountants on this statement.

Table 12.27: Statement 27

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	10	9.01	68.47
Agree	66	59.46	
Unsure	12	10.81	31.53
Disagree	18	16.22	
Strongly Disagree	5	4.50	
Total	111	100	100

The table above indicates that 59.46 percent of chartered accountants agree with statement 27 and 9.01percent strongly agree. Therefore well over half (68.47 percent) of chartered accountants are in agreement with the statement. This

suggests that the majority of chartered accountants are not aware that the values of assets can be meaningfully added to each other in the balance sheet. This also indicates that accountants are not familiar with the principles of representational measurement.

Statement 28: *The values of the items of income in the income statement can be meaningfully added to and subtracted from each other*. This statement tests whether accountants believe that the values of the items of income in the income statement can be meaningfully added to and subtracted from each other. Ryan *et al*. (2002) point out that the relationship between value and monetary units is not known with certainty. This means that it is not known how monetary units are assigned to the units of value. It follows that it is not known whether the rules of assigning monetary units to the values of the items of income are identical. Luce (1996) believes that measurements can only be added to each other if it can be shown that they are not structurally different. This means it is not possible to determine whether monetary units representing the values of different items of income in the income statement are structurally identical. Table 12.28 reflects the responses of the chartered accountants.

Table 12.28: Statement 28

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	13	11.71	70.27
Agree	65	58.56	
Unsure	12	10.81	29.73
Disagree	17	15.32	
Strongly Disagree	4	3.60	
Total	111	100	100

This table shows that 58.56 percent of chartered accountants agree with statement 28 and 11.71 percent strongly agree. In other words, 70.27 percent of chartered accountants are in agreement with the statement. This suggests that

chartered accountants are not aware that that the values of items of income in the income statement cannot be meaningfully added to and subtracted from each other. In chapter 2 it was outlined that measurements that are not identical should not be added to or subtracted from each other. These results suggest that accountants are not familiar with the principles of representational measurement.

Statement 29: *The income generated by cash sales and credit sales can be meaningfully added to each other.* This statement tests whether accountants believe that the income generated by cash sales and credit sales can be meaningfully added to each other. These quantifications are not structurally identical. According to Sterling (1979), all measurements are made at a specific point in time. He argues that the purpose of measurement is to discover the magnitude at that point in time, without regard to what has gone before or what will come after that point. In cash sales the relationship between monetary units received for a commodity and the value of a commodity sold is determined without regard to future time periods, by taking into account the present time variables. In credit sales the relationship between the cash that will be received in future for a commodity sold and the value of a commodity sold takes into account future time periods. This indicates that the two relationships are structurally different and consequently the income generated from credit sales and cash sales cannot be added. Furthermore, Ryan *et al.* (2002) point out that the relationship between monetary units and value is not known. This suggests that it is not possible to determine whether the assignment of monetary units to the value of commodities sold on credit is structurally identical to the assignment of monetary units to commodities sold for cash. Table 12.29 reflects the responses of chartered accountants to this statement.

Table 12.29: Statement 29

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	25	22.52	79.28
Agree	63	56.76	
Unsure	10	9.01	19.82
Disagree	11	9.91	
Strongly Disagree	2	1.80	
Total	111	100	100

From table 12.29 it is clear that 22.52 percent of chartered accountants strongly agree with the statement while 56.76 percent agree: 79.28 percent of chartered accountants are therefore in agreement with the statement. This suggests that chartered accountants are not aware that the income generated by cash sales and credit sales cannot be meaningfully added. This also indicates that accountants are not aware that income generated by cash sales and credit sales is structurally different and cannot be added together. It can therefore be concluded that accountants are not familiar with the principles of representational measurement.

Discussion

This section was designed to test whether accountants are aware that measurements are made at a specific point in time. It has been established in this section that accountants are not aware that measurement occurs at a specific point in time. Furthermore, it is not possible to achieve measurement in the accounting discipline under the going concern concept. All the statements prepared under the going concern assumption are provisional because they are dependent on subsequent events. According to Sterling (1968), subsequent events always lie in the future and can never be known. He also argues that measurement is the discovery of an extant position that requires a present act. Therefore, the dependence of the financial statements prepared under the going

concern assumption on subsequent events means that measurement cannot occur under the going concern assumption. It has also been noted that accountants are not aware that quantifications that represent different attributes of accounting phenomena cannot be added to each other. Moreover, accountants are unaware that quantifications made at different points in time and that represent both identical and different attributes of accounting phenomena cannot be added to each other in financial statements. As outlined earlier, measurements are made at a specific point in time: these quantifications are thus structurally different.

Section 6: The principles of representational measurement

This section is designed to test whether accountants are familiar with the principles of the representational theory of measurement. If accounting is a measurement discipline, as outlined in the accounting literature (IASB, 2006), then accountants who perform the process of measuring the attributes must be familiar with the principles of representational measurement in order to produce accounting measurement information that is in harmony with the principles of representational measurement. Furthermore, Mattessich (1964) notes that accounting measurements are measurements by fiat. He argues that they depend on the intuition of the accountant. If this is the case, it follows that accountants must be familiar with the principles of the representational theory of measurement in order to perform the act of measurement.

Statement 30: *Measurement refers to any method of assigning numbers to represent properties or qualities, according to some set of rules (Larson, 1969).* This definition reflects the relative nature of measurement. It can be inferred from the statement that the process of measurement is defined by the choice of a method of measurement that is used to assign a number to represent a property of a phenomenon in a way that is governed by a consistent set of rules. According to Stevens (1951), numerals can be assigned under different sets of rules, leading to different kinds of scales and different kinds of measurement. This

means that there may be different ways of mapping an empirical relational structure onto an abstract structure. It follows that there is no restriction to the methods that can be chosen in the measurement process. In essence, representational measurement consists in specifying homomorphisms of some qualitative (or empirical) structure onto a numerical one (Narens, 1985). This means that there may be many measurement procedures that can be used for an identical attribute. This statement tests whether accountants are familiar with the definition of representational measurement. Table 12.30 reflects the responses of chartered accountants to this statement.

Table 12.30: Statement 30

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	10	9.01	83.78
Agree	83	74.77	
Unsure	9	8.11	16.21
Disagree	4	3.60	
Strongly Disagree	5	4.50	
Total	111	100	100

The table reflects that 74.77 percent of chartered accountants agree with statement 30 and 9.01 percent strongly agree: 83.78 percent of chartered accountants are therefore in agreement with the statement. This suggests that the majority of chartered accountants believes that the process of measurement is defined by the choice of a method of assigning numbers to represent a property using a consistent set of rules of assignment. It can therefore be concluded that it is reasonable to expect that accountants should be able to distinguish numerical assignments that lead to measurement from those that do not.

Statement 31: *Measurement is a relative matter (it varies in kind, degree, type and precision) (Stevens, 1951).* This statement reflects that measurements must be evaluated with respect to a specific frame of reference. This is one of the

fundamental principles of measurement. Decoene *et al*. (1995) point out that representational measurement equates measurement to numerical coding. This means that measurements made in different environments can be expressed in different ways. Consequently, measurements that are made in different environments should not be compared unless they have been adjusted to common circumstances. Stevens (1951) points out that measurement is relative to the configurations of the environment in which it is performed. This means that the conditions of the comparability of measurements must be specified before measurements can be compared. This statement tests whether accountants are aware that measurement is relative. Table 12.31 reflects the views of the chartered accountants on this statement.

Table 12.31: Statement 31

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	24	21.62	86.48
Agree	72	64.86	
Unsure	7	6.31	13.52
Disagree	8	7.21	
Strongly Disagree	0	0	
Total	111	100	100

The responses to statement 31 reflect that 64.86 percent of chartered accountants agree with statement 31 and 21.62 percent strongly agree with it. In other words, 86.48 percent of chartered accountants are in agreement with statement 31. This suggests that the majority of chartered accountants is aware that measurement is relative and that measurements from different social settings should not be compared unless they have been converted to a common scale of measurement. It can be concluded that accountants are aware that accounting measurement from different social settings should not be compared.

Statement 32: *Every measurement system requires the specification of a scale of some kind (Chambers, 1997).* A scale refers to a rule of measurement. According to Kaplan (1964:177), a rule of measurement defines both the magnitude and the measure. This means that no measurement can occur in the absence of a scale. Chambers (1997), notes that there are no specified scales of measurement in accounting. This suggests that the magnitudes and measures of accounting phenomena are not properly defined in the accounting discipline. This statement tests whether accountants are aware that the specification of a scale of measurement is fundamental to every measurement process. Table 12.32 reflects the responses of the chartered accountants to this statement.

Table 12.32: Statement 32

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	23	20.72	89.19
Agree	76	68.47	
Unsure	10	9.01	10.81
Disagree	2	1.80	
Strongly Disagree	0	0	
Total	111	100	100

The table reveals that 68.47 percent of chartered accountants agree with statement 32 while 20.72 percent strongly agree. That means that 89.19 percent of chartered accountants are in agreement with the statement. This suggests that the majority of chartered accountants is aware of the significance of a scale in a measurement discipline. In chapter 6 it was noted that the object of measurement in accounting is value, and that currently there is no scale of measuring value in accounting. It can therefore be concluded that accountants should be able to understand the significance of the concept of a scale in the measurement of value in accounting.

Statement 33: *An empirically true value of a measured quantity does not exist (Margenau, 1959).* In measurement literature, measurement is never any more than an approximation. According to Margenau (1959*),* what passes for truth in the results of measurement is maximum likelihood. This means that there are no true values of measured quantities. Larson (1969) believes that the accounting discipline overlooks the approximating nature of measurement. The accounting discipline uses terminology that implies exactness that is inconsistent with the approximating character of measurement. In chapter 3 it was established that the accounting concept of measurement does not take into account the concept of error. This statement tests whether accountants are aware of the existence of the concept of error in measurement. Table 12.33 indicates that the views of the chartered accountants on this statement.

Table 12.33: Statement 33

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	9	8.18	23.63
Agree	17	15.45	
Unsure	38	34.55	76.36
Disagree	39	35.45	
Strongly Disagree	7	6.36	
Total	111	100	100

From table 12.33 it is clear that 35.45 percent of chartered accountants disagree and 6.36 percent strongly disagree with statement 33. On the other hand, 34.55 percent of chartered accountants are not sure whether or not to agree with the statement. Therefore, 76.36 percent of chartered accountants are not aware of the concept of error in measurement. The survey indicates that the majority accountants are not aware of the concept of error in measurement. It follows that accountants are not able to tell that accounting measurements are not an exact representation of the properties of accounting phenomena.

Statement 34: *Measurement requires the specification of a property to be measured (Chambers, 1997).* The concept of measurement requires the precise specification of the property to be measured. Caws (1959) notes that measurement presupposes something to be measured, and, unless that something is known, no measurement can have any significance. This implies that if accounting is truly a measurement discipline it must have specified attributes that are of use and interest to measure. However, Chambers (1997) makes the point that the properties that are of use and interest to measure in the accounting discipline are not specified. This suggests that accountants are not aware that it is necessary to specify the property to be measured before measurement can occur (see chapter 2). This statement tests whether accountants are aware that it is not possible to produce a meaningful measure of an unknown entity. Table 12.34 below reflects the views of chartered accountants.

Table 12.34: Statement 34

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	14	12.61	87.38
Agree	83	74.77	
Unsure	10	9.01	12.61
Disagree	4	3.60	
Strongly Disagree	0	0	
Total	111	100	100

The table reveals that 74.77 percent of chartered accountants agree with statement 34 while 12.61 percent strongly agree with it. In total, 87.38 percent of chartered accountants are therefore in agreement with the statement. This suggests that chartered accountants are aware that it is not possible to measure an unknown entity. It can therefore be concluded that accountants are aware that numbers can only be assigned to an entity that can be empirically tested. It was noted in chapter 6 that the properties of value that are currently being measured

in accounting are not specified. It follows that accountants should specify the properties of value that they are currently measuring in accounting.

Statement 35: *Every measurement system requires the specification of a unit in the scale (e.g., Rands, kilograms, etc.) (Luce et al., 1990).* The number assigned to a phenomenon is unique once a scale of measurement has been assigned to it. Churchman and Ratoosh (1959) point out that an empirical hypothesis, or any statement of fact which uses numerical quantities, is empirically meaningful only if its truth-value is invariant under the appropriate transformations of the numerical quantities involved. This means that a number assigned to a phenomenon is meaningless unless a particular representation is specified. In chapter 1 it was pointed out that the object of measurement in accounting is value. Chambers (1997), notes that in the accounting discipline there are no specified scales for measuring value. This suggests that accountants are not aware of the importance of scales of measurement. This statement tests whether accountants are aware that it is necessary to specify the unit in the scale of measurement. Table 12.35 indicates the views of the chartered accountants.

Table 12.35: Statement 35

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	26	23.42	
Agree	73	65.77	89.19
Unsure	5	4.50	
Disagree	6	5.41	9.91
Strongly Disagree	1	0.90	
Total	111	100	100

The table above indicates that 65.77 percent of chartered accountants strongly agree with statement 35 and 23.42 percent strongly agree: 89.19 percent of chartered accountants are therefore in agreement with the statement. The survey indicates that the majority of chartered accountants are aware that it is necessary

to specify the unit in the scale of measurement. In chapter 2 it was noted that measurement cannot occur in the absence of a scale. It can therefore be concluded that the majority of accountants are aware of the importance of a scale in measurement.

Statement 36: *Measurement should take place under specified conditions*. This tests whether accountants are aware that measurements are made with respect to a specific context. It has been established in this study that measurement is relative to a chosen unit. Boyce *et al*. (1994:3) point out that measurement is not meaningful outside a community of discussion unless there is the existence and use of an official standard which has a high degree of acceptance. This means that measurements may be taken in a variety of non-standard situations, such that the raw or crude are not comparable. There is a need to specify the context of the meaningfulness of a measurement. Such a specification enhances the comparability of measures. Table 12.36 indicates the views of chartered accountants on this statement.

Table 12.36: Statement 36

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	19	17.27	84.48
Agree	74	67.21	
Unsure	12	10.91	15.46
Disagree	5	4.55	
Strongly Disagree	0	0	
Total	11	100	100

The responses to statement 36 indicate that 67.21 percent of chartered accountants agree with statement 36 and 17.27 percent strongly agree. In total, 84.48 percent of chartered accountants are therefore in agreement with the statement. This suggests that the majority of chartered accountants are aware that measurement should take place under specified conditions. It can therefore

be concluded that the majority of accountants are aware that measurements are relative to a specific frame of reference.

Question 37: *In a measurement discipline, the property to which numbers will be assigned must be measurable.* A property is measurable if it is capable of being represented by an abstract structure, such as natural numbers. The representations made by the abstract structure must also be meaningful. According to Luce *et al*. (1990), an assertion is meaningless if the attempt to express it in terms of the empirical relational structure shows it to be ambiguous. This means that the underlying empirical relational structure must be capable of being defined absolutely by the abstract structure. It has been established in this study that the qualitative structures of accounting phenomena are ambiguous and consequently not measurable. This statement tests whether accountants are aware that in a measurement discipline, the property to which numbers will be assigned must be measurable. Table 12.37 reflects the views of chartered accountants.

Table 12.37: Statement 37

Rating Scale	Frequency	Percentage %	Analysis of percentages
Strongly Agree	17	15.32	86.48
Agree	79	71.17	
Unsure	14	12.61	13.51
Disagree	1	0.90	
Strongly Disagree	0	0	
Total	111	100	100

The table reflects that 71.17 percent of chartered accountants agree with statement 37 and 15.32 percent strongly agree with it. In other words, 86.49 percent of chartered accountants are therefore in agreement with statement 37. This suggests that the majority of chartered accountants are aware that a property

to which numbers are assigned must be measurable. In chapter 2 it was noted that a property is measurable if it is empirically testable and if it can be represented by an abstract structure in a way that is empirically testable. It can therefore be concluded that the majority of chartered accountants are familiar with the representation measurement principle which states that in a process of measurement the property to which numbers will be assigned must be measurable.

Discussion

This section tested whether accountants are familiar with some of the basic principles of the representational theory of measurement. The responses in this section generally suggest that the majority of accountants are familiar with these principles. However, the responses also indicate that the majority of accountants are not familiar with the concept of error in measurement. Accountants are not aware that there are no exact measurements and that all measurements have an error of some sort. On the other hand, this suggests that the majority of accountants are not familiar with all the principles of measurement. As a result, the accounting concept of measurement implies an exactness that is not consistent with the principles of the representational theory of measurement.

12.3 Conclusion

A questionnaire with 37 statements, formulated in terms of information gleaned from the literature review in chapters 2 to 10, was distributed to chartered accountants. The significant issues flowing from the questionnaires were firstly that accountants, in the majority of cases (Section 1), believe that accounting is a measurement discipline and that accounting information is meaningful. But, as was established in chapters 2 to 10, the accounting concept of measurement is not in harmony with the principles of the representational theory of measurement.

In section 2 it was revealed that the majority of accountants believe that the elements of financial statements have measurable attributes under the current principles of the accounting conceptual framework (IASB, 2006). But it was

established in chapters 2 to 10 that under the current accounting conceptual framework, the elements of financial statements do not have measurable attributes. The attribute of the elements of financial statements that is supposed to be measurable is value. However, in chapter 6 it was established that the value of an element of the financial statement is not measurable. In chapter 2 it was noted that the representational theory of measurement focuses only on those relations that the experimenter wishes to represent with an abstract structure. In this case, the relations among the attributes (values) of the elements of financial statements that accountants wish to represent with an abstract structure (monetary units) are not currently capable of being represented by an abstract structure.

In section 3, the responses to the questionnaire indicate that the majority of accountants are not aware that the principles for recognizing items that meet the definition of an element of financial statements in the financial statement are not in harmony with the principles of the representational theory of measurement. The responses to Section 4 highlight the point that the majority of accountants are not aware that accounting information in financial statements is not objective. Furthermore, they are not aware that accounting information in financial statements describes phenomena that are not objective. This suggests that accountants are not aware that the characteristics of accounting information are not in harmony with the principles of the representational theory of measurement.

The majority of respondents in Section 5 indicated that they were not aware that measurement occurs at a specific point in time. Furthermore, accountants are not aware that it is impossible to achieve measurement in the accounting discipline under the going concern concept. Finally, in Section 6 the responses of the accountants generally indicate that the majority of accountants are familiar with the principles of the representational theory of measurement. However, the responses also indicate that the majority of accountants are not familiar with the concept of error in measurement.

The overall conclusion to be derived from this empirical study is consistent with the hypothesis in chapter 1 that accountants are not aware that the accounting concept of measurement is not in harmony with the principles of the representational theory of measurement.