

**Extensible Business Reporting Language: An Interpretive
Investigation of the Democratisation of Financial Reporting**

by

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Abstract

Computer and telecommunications technologies are commonly thought to provide solutions to the quantitative and qualitative demands on modern financial reporting. Extensible Business Reporting Language ('XBRL') is an emergent technology that is purported to 'democratise' financial reporting.

This investigation of whether XBRL democratises financial reporting is undertaken from a constructivist perspective. It is argued that the rhetoric of democratisation and technological determinism that feature in financial reporting literature do not provide a reliable basis for investigations of emergent technologies. An interpretive research framework is therefore preferred as appropriate to the stage of development of XBRL technology. This thesis utilises research methods based on Osgood, Suci and Tannenbaum's (1957) semantic differential.

XBRL-knowledgeable individuals are asked whether they agree with the assertion that 'XBRL democratises financial reporting'. In addition, their perceptions of each of 'XBRL', 'financial reporting' and 'democratisation' are elicited in order to assess whether they have a common interpretation of the assertion.

Sixty-seven percent of survey respondents profess to agree with the assertion, 13% explicitly disagree and 20% are non-committal. However, interpretation and analysis of each of the concepts reveal statistically significant relationships between responses to the assertion and interpretations of its constituent concepts. Based on different perceptions of the concepts, it is concluded that respondents are not agreeing and disagreeing about the same phenomena. Consequently, it is premature to assert that 'XBRL democratises financial reporting' is an objective truth.

This thesis illustrates how appropriate research design facilitates interpretation and assessment of the potentially subjective assertions that accompany emerging technologies. Semantic differential techniques are applied for the first time to the XBRL domain and to technological aspects of financial reporting. Interpretations of 'XBRL', 'financial reporting' and 'democratisation' reveal the similarities and differences in perceptions that are held by XBRL-knowledgeable individuals. The differences indicate that the rhetoric of democratisation does not yet describe the reality of the relationship between financial reporting and XBRL. However, as XBRL matures, the multi-dimensional interpretive frameworks developed in this thesis can be refined and re-applied. It is argued that this approach to researching XBRL is preferable to simplistic assumptions based on technological determinism. It also provides a more reliable basis for positivist-oriented research and for accounting research in general.

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List of Abbreviations

ACCA	Association of Chartered Certified Accountants
AIS	Accounting Information Systems
ANOVA	Analysis of Variance
ASB	Accounting Standards Board
CSR	Corporate Social Reporting
EPA	Evaluative Potency Activity
GAAP	Generally Accepted Accounting Principles
HTML	Hypertext Markup Language
ICAEW	Institute of Chartered Accountants in England and Wales
IASC	International Accounting Standards Committee
IFR	Internet Financial Reporting
IFRS	International Financial Reporting Standards
IS	Information Systems
IT	Information Technologies
MS	Microsoft
PDF	Portable Document Format
SEC	Securities and Exchange Commission
SSK	Sociology of Scientific Knowledge
TAM	Technology Acceptance Model
XBRL	Extensible Business Reporting Language
XML	Extensible Markup Language

Chapter One: Introduction

1.1 Background to the research

Given an increasingly complex, competitive, fast-paced global business environment, recognition of broader societal stakeholder interest in business activities, and increasing social demands for corporate accountability, the quantitative and qualitative demands on financial reporting have increased substantially during the last twenty years (Ashbaugh, et al., 1999). To deal with the variety and magnitude of modern financial reporting, preparers and users of financial reports have increasingly turned to computer and telecommunications technologies. Since the introduction of the first spreadsheet application in the late 1970s, accounting has developed to incorporate use of desktop and server computing, bespoke software applications, network connectivity (including the internet and cloud computing) and, more recently, Extensible Business Reporting Language ('XBRL').

The emergence of technologies such as the internet and XBRL has resulted in periodic assertions of the 'democratisation' of financial reporting (Weverka & So, 2008; Cox, 2006; Dizard, 2006; Debreceny, et al., 2005; FASB, 2000; Andersen, 2000; Trites, 1999; Lymer, 1999; Baldwin & Williams, 1999; Spaul, 1998; Tapscott, 1996). At first glance, it appears that information technologies (IT) have not only responded to the 21st Century challenges of global competition and specialist capital markets but have enhanced the democratic state of financial reporting.

The association of emergent technologies with assertions of democratisation, or similar claims of revolutionary or paradigmatic change, is not unusual. These claims appear to

be typical of the rhetoric argued by the advocates of various emergent technologies. It is unsurprising, therefore, that assertions of the democratisation of financial reporting are associated with XBRL. However, there appears to be a disconnect between the rhetoric of democratisation and the social reality of financial reporting research and practice. Whereas proclamations of the democratisation of financial reporting because of the internet and XBRL are easily found, the evidence to support such assertions is not as obvious.

Part of the problem, at least, is that the meanings of concepts, such as ‘democratisation’, are contestable. What exactly does it mean to ‘democratise’ financial reporting? Democratisation may mean different things to different people. Similarly, perceptions of new technologies, such as XBRL, may also differ among stakeholders because the effects of XBRL can be argued to depend on how it is deployed in financial reporting systems. Thus, until XBRL matures sufficiently to the point where its deployment is a matter of routine, its nature and significance may be a matter of individual perception. Furthermore, perceptions of a relatively mature concept, such as financial reporting, may be disrupted by the emergence of new technologies. Previously held perceptions regarding the nature or effectiveness of financial reporting may change precisely because of the introduction of a new technology such as XBRL.

The objective of this thesis is to investigate whether ‘XBRL democratises financial reporting’. Central to the investigation is to identify perceptions of the concepts that are included in the assertion. Whereas two individuals may profess to agree with the assertion that ‘XBRL democratises financial reporting’, they may have significantly different perceptions of ‘XBRL’, ‘financial reporting’ or ‘democratisation’. If so, it

may be argued that they are not agreeing, in fact, about the same phenomena. Thus, the truth of a matter, which may be apparent at one level of analysis, becomes questionable at another. In order to determine the truth of whether ‘XBRL democratises financial reporting’, it is therefore necessary to conclude that perceptions of ‘XBRL’, ‘financial reporting’ and ‘democratisation’ are shared sufficiently. In order to achieve the objective of the thesis, research methods are developed and deployed to address the potentially dynamic nature of ‘XBRL’, ‘financial reporting’ and ‘democratisation’.

1.2 Research problem

If a technology appears to have the potential to democratise or cause revolutionary change, few would disagree with the suggestion that the technology is, in principle, worth researching. However, in the case of accounting and financial reporting, the nature of research undertaken during the emergent stages of new technologies does not always appear to match the accompanying rhetoric. Sutton (1992) summarises three major areas of weakness in early accounting information systems (AIS) research as (i) an almost total absence of theory, (ii) a focus on descriptive studies, and (iii) limited analysis of data yielding little insight into meaningful relationships. Xiao, et al., (1996) are also critical of the absence of theoretical guidance and simplistic assumptions regarding the assumed nature of the relationships between accounting and IT. As a result, they conclude that contributions to the development of robust financial reporting theory and practice at the crucial emergent stage of new technologies are limited.

It is posited in this thesis that these weaknesses arise because accounting researchers accept rhetorical assertions such as the democratisation of financial reporting prematurely without fully understanding technologies such as XBRL at the emergent

stage of development or appreciating that concepts, such as ‘democratisation’ and ‘financial reporting’, may be matters of dynamic perception. When considering emergent financial reporting technologies, accounting researchers may be susceptible to implicit assumptions of technological determinism. Believing that technology has the inherent capability to effect change can make the rhetoric of democratisation appear plausible and even logical. The position adopted in this thesis is that emergent financial reporting technologies are too frequently perceived in the literature as mature ‘black-box’ phenomena. Consequently, as Daft and Wiginton (1979, p.187) state: “*If complex organisational behaviours are modelled as if they are simple, well understood, deterministic systems, ..., then the resulting models will tend to be insignificant*”. The problem, therefore, is that assertions regarding the effects of new technologies on financial reporting may not be exposed sufficiently to rigorous examination specifically at the emergent stage of development. In short, the truth of rhetorical assertions is insufficiently questioned at the emergent stage.

This thesis exposes the rhetoric of the democratisation of financial reporting to rigorous examination. The emergence of XBRL provides an opportunity to consider the rhetorical claims that typically accompany new technologies and to consider XBRL specifically at its developmental stage. There are no presumptions regarding the capabilities of XBRL and no *a priori* perceptions of ‘XBRL’, ‘financial reporting’ or ‘democratisation’. The truth of the matter is determined by whether there (i) is sufficient agreement with the assertion that ‘XBRL democratises financial reporting’, and (ii) are sufficiently shared interpretations of each of ‘XBRL’, ‘financial reporting’ and ‘democratisation’. As such, the possibility that there are different perceptions of concepts is facilitated. In order to assert that ‘XBRL democratises financial reporting’,

there should be an identifiable consensus regarding the meanings of the constituent concepts.

1.3 Justification of the research

This thesis is motivated by the potential of XBRL to make a significant difference to the theory and practice of financial reporting. There is little doubt that computer and telecommunication solutions are perceived as a solution to increasing demands for high-quality financial reporting (Williams, et al., 2006; Bovee, et al., 2005; FASB, 2000; Lymer, et al., 1999; Wallman, 1997). As an abstract concept, XBRL appears to provide a meaningful solution to the problem of how to standardise the electronic communication of financial reporting information in order to facilitate efficient analysis. On this basis, investigations of existing and potential relationships between XBRL and financial reporting are valuable.

However, there is the possibility of the same disconnect previously noted between the rhetorical claims that accompany the appearance of a new technology and the predominant type of accounting research undertaken during its emergent stage of development. This thesis is also motivated, therefore, by the belief that accounting research of an emergent technology should be more than descriptive in nature. Furthermore, it should attempt to identify meaningful relationships between new and possibly dynamic variables from the outset rather than assume the truth of the rhetoric.

Sutton (2004) and Xiao, et al., (1996) highlight the weaknesses in accounting research of new information technologies. The consequence of focussing on descriptive studies rather than identifying meaningful relationships or theoretical development is that

relatively little is learned from accounting or financial reporting perspectives during the emergent stage of technological development. As a result, opportunities to influence technological development during the crucial emergent stage may be irretrievably missed. Furthermore, although descriptive research may be argued in general to contribute to a theorising process, there is little evidence to suggest that financial reporting theoretical frameworks are influenced by the outcomes of such descriptive research. This thesis is justified on the basis that its objectives include the investigation of meaningful relationships between XBRL and financial reporting in order to establish a reliable and verifiable basis for subsequent research.

It is reasonable to suggest that the democratisation of financial reporting may be intended to describe a positive development such as an improvement in the quality of financial reporting or accountability. The concept of democratisation may be invoked to suggest momentous change in the same way that ‘revolutionary changes’ and ‘paradigmatic shifts’ are intended to signal significant changes. However, there are different models of democracy and accountability that can change over time and from one place to another. Thus, regardless of intentions, describing financial reporting as democratised may be, ultimately, a meaningless phrase that provides no basis for action or understanding.

Investigations of meaningful relationships between XBRL and financial reporting must therefore include specific consideration of assertions such as ‘XBRL democratises financial reporting’. Because the assertion can be interpreted in a variety of ways, it is unhelpful to use it as the basis of an argument unless the context is explicitly articulated or until there is a consensus as to its meaning. However, the intended meaning

democratisation of financial reporting has invariably remained unexplained in the literature and the reader is left to draw his own conclusions, or not as the case may be.

It is posited, therefore, that the weaknesses highlighted by Sutton (1992) and Xiao, et al., (1996), and which are evident in accounting research of internet financial reporting, may be attributable to the vagueness of the assertions that relate financial reporting to emergent technologies. This thesis is justified on the basis that it specifically investigates the vagueness of the rhetoric of 'XBRL democratises financial reporting' in order to determine whether there is, in fact, a consensus as to its meaning and veracity.

If the veracity of the assertion is evident and is based on a consensus as to the meanings of the concepts included in the assertion, then the legitimacy of the assertion may be argued to have been established by reference to a rigorous academic investigation rather than simplistic assumptions of technological determinism. If the veracity of the assertion is either not evident or is evident but not based on a consensus as to the meanings of the concepts, the implication is that use of the assertion for research purposes is inappropriate at this time. Either way, the outcome of this thesis can provide useful reference points for accounting researchers.

The methods adopted to investigate assertions of the democratisation of financial reporting may be re-used over time to either confirm the status quo or recognise a change in the veracity of the assertion or consensus regarding the meanings of concepts. While 'XBRL democratises financial reporting' is the assertion that is the subject of this thesis, the research design may be applied to assertions of a similar nature. The next section sets out an overview of the research methodology and methods.

1.4 Research methodology

The absence of the development of financial reporting theory, notwithstanding the emergence of new technologies and rhetorical assertions, is also attributed in this thesis to a body of financial accounting research that is limited in terms of its methodological scope. The nature of extant literature is predominantly positivist in orientation. It is argued that positivist research designs are most appropriate when variables and variable attributes are established and defined, and that this is not the case in the accounting domain for emergent computer and telecommunications technologies such as the internet and XBRL. The ideologies of individualism and positivism¹ constrain the possibilities of investigating the social effects of new technologies and assessing whether the meanings and significance of new technologies are shared.

It is for this reason that an interpretive methodological perspective is utilised in this thesis. Orlikowski and Baroudi (1991) opine that positivism has insufficient methodological variety for the nature of the phenomena investigated by information systems (IS) researchers. They call for a combination of interpretive and positivist methods, an approach they refer to as '*weak constructionism*'. Taking this approach, induction and interpretation are argued to be more appropriate at the emergent stage of a new financial reporting technology. Positivist research can usefully follow the interpretive stage once the meaning and significance of the new technology are well established.

¹Positivism is typically characterised by ontological realism, an *a priori* definition of a theoretical framework and subsequent collection of empirical data for the purposes of testing and developing the framework. See Chapter Three for further discussion on positivism and methodological alternatives.

The interpretive perspective specifically considers the meanings of concepts held by social groups as part of the investigation of the research problem. Thus, rhetorical assertions of democratisation are, *a priori*, neither accepted nor rejected. The emphasis is on language as the basis of truth and on understanding the possibility of a metaphorical re-description of a phenomenon, which if accepted as the consensus within social groups becomes the truth of a matter.

1.5 Outline of the thesis

1.5.1 Literature review

Chapter Two presents a review of the relevant literature. It sets out the research environment in which the research problem exists and within which this research investigation is undertaken. Contingent meanings of democracy and accountability are explained. The concept of technological determinism is also set out to illustrate how societal change can be argued to be attributable to the emergence of new technologies. The rhetoric of democratisation, technological determinism and an appreciation of the contingency of meaning provide the context within which financial reporting research, in the context of IS, is reviewed.

The evolution of accounting and financial reporting as an IS discipline is explained. In particular, the limitations of how information technologies are researched from an accounting perspective, specifically the over-simplification of emerging relationships between financial reporting and new technologies, are highlighted. The predominance of descriptive-type research and the absence of theoretical considerations are attributed to accounting researchers favouring positivist research methodologies. It is posited that,

whereas positivist perspectives can be effective when research variables are established and largely uncontested (Perry, 1998), this research approach may be less effective when considering the dynamics of emergent technologies. Furthermore, innovation and technology acceptance studies suggest that ‘democratising’-type relationships between emergent technologies for financial reporting should not be assumed.

The particular emergent technology of interest, XBRL, is then explained in terms of its nature and rationale. The similarity of the rhetoric associated with XBRL and the rhetoric associated with previous financial reporting technologies is highlighted. There is evidence of a predominance of descriptive-type research relating to XBRL that is similar to previous financial reporting technologies. It is concluded that perceptions of emergent technologies as ‘black-box’ phenomena and consequent adoption of positivist research methodologies are unlikely to enhance either the theory or practice of financial reporting.

1.5.2 Research methodology and methods

Chapter Three outlines the main methodological alternatives to positivist research perspectives, namely interpretive and critical perspectives. Each is explained in terms of ontology, epistemology, human nature and the role of the researcher. The research circumstances in which each can be most effective is also highlighted. Methodological choices regarding quantitative and qualitative data analysis are also set out.

The constraints of a positivist research approach provide the motive to consider a research framework that owes more to constructivist than deterministic thinking. The philosophies of Putnam (1981), Pinch and Bijker (1987), Mouck (1994), Mattessich

(1995) and Habermas (1970) in general, and Rorty (1989) and Searle (1995) in particular, provide the basis of a social and institutional reality. Language, meaning and linguistic interaction are argued to underpin socially constructed truths and realities. Distinctions between the epistemic objectivity and subjectivity of phenomena are also significant.

This thesis is undertaken within an interpretive research framework. With particular reference to Searle's (1995) institutional reality, an assertion of the democratisation of financial reporting because of XBRL is hypothesised as a potential new institutional fact. The truth of the matter is assessed by reference to the coherence theory of truth. Collective agreement with the assertion that 'XBRL democratises financial reporting' **and** collective recognition of the epistemic objectivity of the concepts included in the assertion are the criteria to justify a conclusion that XBRL democratises financial reporting.

The research methods detail how data are collected and analysed. Implementation of a research framework in which interpretations of concepts are fundamental is a significant challenge in terms of facilitating contextual analysis yet generating reliable and valid findings with due consideration of the rigour that is required in academic research. Osgood, et al.,'s (1957) semantic differential is the means of collecting and analysing data that is regarded as particularly suitable to the objectives of this thesis. A semantic differential survey instrument provides the mechanism whereby connotative interpretations of concepts may be quantitatively located as coordinates in multi-dimensional semantic spaces. For a given concept, the semantic space within which it

is interpreted is mapped using bi-polar adjectival scales². The concept may then be operationally interpreted and located within the mapped semantic space by reference to measured scalar responses to the adjectival scales. Locating quantified interpretations of concepts within standardised semantic spaces enables comparisons of interpretations and facilitates the investigation of statistically significant relationships.

Semantic differential instruments must be specifically developed for each application. There is no standard list of adjectival scales that may be applied routinely to all research circumstances. The approach taken to developing the instrument for use in this thesis is therefore explained. The explanation includes references to factor analysis, which is a collection of statistical techniques that explore relationships among measured variables (such as bi-polar adjectival scales) in order to summarise them as a smaller number of underlying factors. For a given concept, the underlying factors form the dimensions of the semantic space within which interpretations of the concept are located. The location coordinates of an individual's interpretation of the given concept are also calculated using factor analysis and are referred to as factor scores.

Explanations of the semantic differential instrument and factor analysis are followed by a review of their application in accounting and IS research. Applications include investigations of the acceptance of emerging technologies and therefore support their use in this thesis.

Chapter Three concludes that an interpretive research perspective is a suitable methodological basis upon which to investigate an emerging technology such as XBRL.

²Examples: '*good-bad*', '*strong-weak*', '*active-passive*'.

The interpretive research approach manifests itself as a semantic differential survey instrument and factor analyses of the collected data. The epistemic objectivity or subjectivity, and hence conclusions regarding the existence of the potentially new institutional fact that XBRL democratises financial reporting, are assessed on this basis.

1.5.3 Research question and procedures

The specifics of the research question and procedures applied to answer it are set out in Chapter Four. The central research question of this thesis is:

‘Does XBRL democratise financial reporting?’

XBRL is representative of emerging financial reporting technologies and the asserted democratisation of financial reporting represents the type of rhetoric that accounting researchers utilise in order to justify research studies that purportedly investigate the impact of new information technologies. As such, this research question confronts rather than implicitly accepts the rhetorical ‘truths’ that are commonly associated with emerging financial reporting technologies.

The research question is expressed in terms of whether the democratisation of financial reporting is an example of Searle’s (1995) institutional reality. In order to affirm the existence of an institutional fact, it is not enough that respondents to the question provide a positive or negative response. It is also necessary to conclude that the concepts included in the question are not epistemically subjective.

The semantic differential is argued to be an effective research method to achieve the objectives of this thesis on the basis that it facilitates the possibility of assessing the

epistemic status of the concepts. As interpretations of concepts based on semantic differential instruments depend wholly on the bi-polar adjectival scales that are included in the instrument (and which map a concept's semantic space), the selection of appropriate adjectival scales is a significant part of the development of the survey instrument. The approach taken to the selection of scales for inclusion in the survey instrument is set out in detail.

The challenge of selecting an appropriate sample of survey participants is also explained. The main requirement of survey participants is to have knowledge of the nature of and rationale for XBRL. In the absence of an obvious sampling frame, the methodical procedures undertaken to generate a suitable research sample from a number of sources are set out.

Pilot testing is undertaken for the purposes of (i) refining and finalising the semantic differential survey instrument, and (ii) demonstrating that it is capable of generating data that usefully contribute to answering the research question. The pilot testing also includes research reliability and validity considerations.

The outcomes of Chapter Four are (i) explanation of a research question that is representative of the identified research problem, (ii) development of the semantic differential survey instrument that is deployed to collect relevant data, (iii) identification of the research sample from whom data are collected, and (iv) pilot testing of the research procedures including the finalisation of a valid and reliable survey instrument.

1.5.4 Findings and analysis

Chapter Five presents the findings and analysis. Two hundred and forty nine XBRL-knowledgeable individuals responded to the survey, which corresponds to a 61% response rate. Sixty seven percent of respondents ‘agree strongly’ or ‘agree’ with the substantive assertion that ‘XBRL democratises financial reporting’. If the epistemic objectivity of the concepts included in the substantive assertion is presumed, then the democratisation of financial reporting because of XBRL may be argued to be true and accounting researchers may rely on the truth of the assertion. However, the epistemic objectivity of the concepts is not presumed in this thesis. Interpretations of the concepts, as elicited from survey respondents using the semantic differential instrument, are derived and compared.

Chapter Five presents evidence to indicate that ‘XBRL’ is interpreted most significantly in terms of utility, usability and availability. These assigned labels, derived from factor analysis of the semantic differential data, constitute the interpretive framework of XBRL. In other words, they are the dimensions of the semantic space within which XBRL is interpreted and provide the framework for locating interpretations of XBRL within that semantic space. Similarly, ‘financial reporting’ is interpreted primarily in terms of integrity, flexibility and complexity. ‘Democratisation’ is interpreted in terms of positivity and completeness.

The interpretive frameworks of ‘XBRL’, ‘financial reporting’ and ‘democratisation’ are each demonstrated in Chapter Five to be stable when all survey respondents are included in the factor analyses. Stable interpretive frameworks suggest that the concepts may not have contingent meanings, which in turn, suggests that the concepts

may be epistemically objective. However, the epistemic status of each of the concepts is ultimately assessed in Chapter Five by reference to whether there are statistically significant relationships between responses to the substantive assertion and each of (i) interpretations of the concepts (as measured by factor scores), and (ii) individual scale ratings on the semantic differential instrument. If concepts are epistemically objective, no statistically significant relationship between interpretations and responses are expected.

The epistemic status of concepts is also assessed by reference to whether the interpretive frameworks that are stable when all respondents are considered remain stable when interpretive frameworks are derived for sub-groups (membership of which is determined by responses to the substantive assertion). If concepts are epistemically objective, interpretive frameworks are expected to remain consistent in terms of component factors within and between sub-groups.

Chapter Five concludes that epistemic objectivity of the concepts is somewhat arguable based on stable interpretive frameworks for each concept for all respondents. However, evidence of the existence of statistically significant relationships between factor scores/scale ratings and responses to the substantive assertion combined with insufficiently stable interpretive frameworks for subgroups is persuasive in terms of concluding that the concepts are epistemically subjective. Accordingly, it is premature to conclude objectively that XBRL democratises financial reporting.

1.5.5 Discussion and conclusions

Chapter Six elaborates on the findings and analysis. The primary conclusion of the thesis is that it is premature to assert that XBRL democratises financial reporting on the basis that there is insufficient evidence of the epistemic objectivity of the concepts included in the assertion. In terms of Searle's (1995) institutional reality, it is not yet reasonable to conclude that the democratisation of financial reporting is a new institutional fact.

Re-visiting the accounting research problem, Chapter Six explains how the conclusions of this thesis support the observation that accounting researchers prematurely adopt 'black box' realist perspectives in relation to emerging technologies such as XBRL. The consequences of not fully understanding the complexities of the social realities in which new technologies are developed and deployed are those accounting research shortcomings identified by Sutton (1992) and Xiao, et al., (1996) and which are subsequently evident in internet financial reporting (IFR) and XBRL research. Simplistic deterministic assumptions regarding the relationship between financial reporting and technology, a predominance of descriptive research justified by the rhetoric of democratisation and technological determinism, and an almost total absence of a theoretical basis to the research limit the value of accounting research of financial reporting technologies.

Chapter Six emphasises the need to base research on something more than rhetoric. This thesis exemplifies a research approach that facilitates the contingency of meaning within a financial reporting social reality. The importance of utilising appropriate methodology at different stages of technological development is highlighted. In other

words, accounting research must evolve from an understanding of the domain rather than the mere availability of a new technology.

Chapter Six refers to the limitations of this thesis and consequent opportunities to undertake complementary research. This thesis is argued to provide a basis for robust development of accounting theory by demonstrating how assertions regarding emergent technologies may or may not be shown to be a reliable foundation for positivist-type research.

1.6 Conclusion

Chapter One lays the foundations for the thesis. It introduces the research problem and expresses the specific research question that is representative of the problem. The justification for the research is set out, the methodology described and summaries of each of the chapters provided.

The thesis proceeds with a detailed description of the research.

Chapter Two: Literature Review

2.1 Introduction

A critical review of existing literature provides the foundation upon which new academic research is built. The objectives of a literature review are (i) to describe and critically discuss work that has been undertaken in the subject domains that are of relevance to the thesis, and (ii) to highlight key matters in terms of substantive findings, methodological orientations, interpretations, omissions or bias. An effective literature review provides the background knowledge necessary to explain and justify both the research question and the methodology employed to answer it. The sources of a literature review include peer-reviewed academic journals, textbooks, and professional publications (Beins 2004, p.69; Saunders, et al., 2000, p.45).

Accounting research makes use of literature from a wide range of disciplines. A substantial volume of accounting research theory is underpinned by literature from the subject domains of economics, finance, sociology and psychology (Smith 2003, p.40; Saunders, et al., 2000, p.44). The objectives of this chapter (in conjunction with Chapter Three) are to (i) present a review of the literature that is pertinent to an investigation of an emergent financial reporting technology such as XBRL, and (ii) justify the particular methodological approach adopted. Chapter Three addresses the methodological considerations in detail.

The parent disciplines reviewed in this chapter are democracy and technology. The contingent nature of democracy, as a societal concept, is explained. Contingent meanings of democratisation are explored with particular attention to notions of

democratisation within a capitalist oriented society. Associations of democracy with accountability facilitate a review of democratisation in the specific context of financial reporting. The meaning of technology is also set out, firstly in general terms, and then with specific reference to whether and how technological developments effect societal change.

The parent disciplines of democracy, accountability and technology provide the basis for introducing the immediate subject disciplines of financial reporting and XBRL. The literature pertaining to development of financial reporting as a technology is reviewed in the context of contingent meanings of democratisation and the contestable assumption of technological determinism. This approach reveals the implicit but contestable assumptions that underpin a significant proportion of accounting literature that has examined relationships between financial reporting and IT.

The nature of and rationale for XBRL is presented. A review of the XBRL research undertaken from an accounting perspective reveals similar limitations, in terms of research design and approach, to those that are evident in earlier AIS and IFR research.

This chapter concludes that the development of robust theories about emergent financial reporting technologies has not been assisted by a predominance of descriptive and speculative research that is underpinned by a rhetoric of democratisation and implicit assumptions of hard technological determinism. This thesis posits that financial accounting research of new technologies should specifically incorporate the contingency of meanings and interpretations (that are an inherent part of new developments) into the research design.

2.2 Democracy, accountability and financial reporting

2.2.1 Understanding democracy

Democracy, as it is commonly understood at the beginning of the 21st Century, may be defined as ‘*government by the people, exercised either directly (participatory democracy) or through elected representatives (representative democracy)*’ (Dictionary.com³ 2010a). Democracy reflects the political orientation of those who favour government directly by the people or by their elected representatives. An identifiable majority or representatives of an identifiable majority, of an organised group (also identifiable), can make decisions that are binding subject to protection of the minority against oppression. According to Zakaria (2003, p.13), democracy is the sole surviving source of political legitimacy for the vast majority of the world.

This understanding of democracy as ‘rule by the people’ may initially appear to be a simple enough concept but the history of democracy, as an idea, is complex and marked by conflicting interpretations (Held 1987, p.2). In addition to choices between participatory and representative style democracies, any analysis of the concept invariably raises questions regarding the precise meaning of the term. For example:

- What is the scope of the activities of ‘government’?
- To what extent is it acceptable for government to encroach on the rights and liberties of individuals or groups of individuals?

³ The content for dictionary.com comes from 15 authoritative licensed and proprietary reference sources. These sources include Harper Collins, Random House, Webster and Houghton Mifflin. It is regarded to be a reliable and authoritative source for the purpose of this thesis.

- Who is included in ‘the people’? A review of democracy reveals that inclusion or exclusion depended at various times throughout history on family background, ethnicity, wealth, gender, age and specific definitions of citizenship.
- Does each person included in ‘the people’ have equal input?
- What are the mechanisms by which majorities, whose decisions bind ‘the people’, are determined? Is it always a case of simple majority?

Different models of democracy emerge depending on the prevailing answers to these questions. Whereas all models may share a common vision of reducing arbitrary power and regulatory capacity to the lowest possible extent, the manner in which the universal ideals of equality, liberty and justice are pursued is the distinguishing feature of the various models.

The origins of democracy, as a concept, are found in classical antiquity (Siedentop 2000, p.52). The classical model is referred to as ‘classical republicanism’. Analysis reveals, however, that it is based on very different values to those that might typically be attributed to 21st Century democracy. At that time, society gave primacy to the public sphere over that of the private. Patriotism, group solidarity and discourse during public assembly underpinned classical republicanism. Citizens were free, and encouraged, to participate in public debate but private desires and individualism were frowned upon. The ‘market’, as a mechanism for the organisation of society, was distrusted.

Public debate is recognised today as a desirable aspect of modern democracy, but a key distinction between the classical republican model of democracy and modern versions relates to the ‘freedom’ of citizens – freedom was not intended in classical antiquity to

be a moral principle. Instead, it reflected a status of privilege given to designated citizens. Democracy based on classical republicanism made no pretence at implying justice or equity for all.

Although the Greek experiment with democracy became an inspiration for democrats, it left no tangible or institutional influences on politics in Europe (Zakaria 2003, p.31). Instead, assumptions of natural equality and a contractual model of society provided the framework for the emergence of democracy based on liberty and equality as we might recognise it today (Siedentop 2000, p.57). From the Age of Enlightenment in the 17th and 18th centuries, individualism emerged based on a principle of moral equality of all people. Liberty ceased to be a status for citizens, became a moral principle applicable to all and, in due course, came to be supported by the rule of law. Thus, equality before the law based on the assumption of individual rights replaced privilege as the fundamental principle of social organisation. Moreover, the private sphere was no longer treated with the contempt in which it was held under classical republicanism.

Two significant consequences of democracy underpinned by the philosophies of liberty and equality are (i) the nation state and (ii) capitalism (Siedentop 2000, p.60). The interdependence of private sphere capitalism and the nation state has resulted in two prominent models of democracy that are based on right- and left-wing thought. Right-wing thinkers (liberal democrats) hold the individual to be sacrosanct. The individual is free only to the extent that self-chosen ends may be pursued. A government exists only to safeguard the rights and liberties of each citizen, who is ultimately the best judge of his own interests. A government is the burden individuals have to bear to secure their

own ends. Liberalism may be equated with individualism and minimum political impediment.

In contrast, left-wing thinkers (social democrats) defend the desirability of social means and goals. Socialism questions whether societal progress is possible in a world dominated by private ownership and a capitalist economy. Social democrats actively seek to uncover the conditions under which the development of individual freedom is compatible with the development of society. This contrasts with the thinking of liberal democrats who assume that desirable social outcomes result naturally from the effects of individual efforts.

Siedentop (2000, p.61) refers to the antagonistic values as ‘the dilemma of modern democracy’. On the one hand, citizens like the idea of being able to share in public power based on classical republican notions of public debate, participation and discourse. On the other hand, individuals do not wish to jeopardise private space and personal autonomy and thus may not want remote representative governance to encroach on individual freedoms. The resultant challenge to societies wishing to live in accordance with the principles of democracy has been to strike the appropriate balance between the public and private societal spheres in accordance with the wishes of constituents.

Different interpretations of ‘democracy’ lead naturally to the question of the meaning of ‘democratisation’. ‘Democratisation’ may be defined as *‘the action of making something democratic’* (Dictionary.com, 2010b) but this definition is also subject to the complexities of ‘democracy’. Mouck (1994) refers to weak and strong forms of democracy. Weak forms of democracy assume various forms of ontological

individualism. Private interests are inherent endowments of individuals and public interest derives from overlapping private individual interests. Democratic freedom, in the weak conception, is the freedom to choose among pre-existing ends, whether marketplace goods or political candidates. The degree of freedom is underpinned by economic power in that corporate citizens leverage finance to exert power and influence.

Strong democracy is participatory politics. It assumes that individuals are shaped and reshaped by the linguistic world they inhabit. Past events and ideas can be re-described to yield different notions, present paradigms can be challenged by re-description and visions of the future can be imagined and communicated via language. Democratic talk allows for the exchange of solutions to problems and the challenge of each other's predictions and assumptions. Democratic participation does not depend on having sufficient economic resources and only requires that individuals be prepared to re-evaluate values, preferences and beliefs.

In the context of Mouck's (1994) distinction between weak and strong democracy, the meaning of 'democratisation' can be interpreted as either a migration from weaker to stronger democracy or from stronger to weaker democracy (depending on ideological viewpoints).

2.2.2 Democracy and corporate accountability

The rationale for accountability in business communities, as it might be recognised today, stems from the emergence of capitalism during the 19th Century and the separation of business ownership from day to day management. Investors who

entrusted their wealth to professional managers had reasonable expectations that managers should be accountable for actions undertaken on their behalf. In a corporate context, to be accountable is to be called to account to some authority for one's actions (Mulgan, 2000). Three attributes of accountability are (i) the authority to whom one accounts is external, (ii) there is social interaction between the parties such that one side seeks answers and rectification while the other responds and accepts sanctions, (iii) those calling for an account assert rights of superior authority, including the right to demand answers and impose sanctions. There are evident similarities between a general understanding of 'democracy' in a social context and 'accountability' in a corporate setting.

However, the emergence of capitalism also had a profound effect on interpretations of the scope of accountability (Chen, 1975). Because capitalism is based on notions of individualism, it caused a decline in the social responsibilities of business organisations. The previously held notion that both business and societal interests could and should be equally served was eroded by capitalism. Business ideology underpinned by rational self-interest and presumptions of efficient market mechanisms had the effect of relegating wider social responsibilities to the background. The assumption was that desirable societal development would naturally result from the combined effects of individualism. Although professionalism and personal morality of management still counted, it played a secondary role. This particular model of corporate accountability is reflected in Benston's (1982) theory of corporate accountability - business organisations are accountable to (i) shareholders and (ii) those having direct contractual or transactional relations with the organisation (stakeholders). Accountability is based on shareholders and stakeholders having identifiable powers of sanction and, as long as

business organisations operate within the rules of law, the interests of wider society depend upon the indirect efficiency of market forces (Mouck, 2004). . Accountability, based on the liberal economic principles that emerged from the 19th Century onwards was therefore a weak form of democracy. The dissemination of information discharged accountability for those who had sufficient economic (and therefore political) power.

Social democrats would argue that stronger democracy requires an expanded form of corporate accountability that goes far beyond that espoused by Benston (1982) in order to provide smaller stakeholders and wider societal interests with the power to effect change (Mouck, 2004). The growth of corporate entities and individual wealth in capitalist oriented societies has had the effect of eroding the extent to which, in economic terms, ‘smaller’ shareholders and stakeholders can demand accountability. In the business community, if the power to demand accountability is increasingly determined by economic wealth, then the power of the smaller stakeholder is diminished. Smaller stakeholders become merely corporate citizens with the option of retaining or relinquishing that citizenship.

Liberals would argue that corporate society based on capitalism may be the weaker form of democracy (in Mouck’s (1994) terms) but is a preferable way to organise society. In short, when democracy, democratisation and accountability are spoken of, these concepts for individuals and groups are fundamentally matters of beliefs, values and interpretations. Ultimately, there are no uncontested interpretations of these concepts.

2.2.3 Accountability and the role of financial reporting

The dissemination of information is an integral part of discharging accountability. Financial reporting, being the dissemination of information about business entities, developed as a result of the emergence of capitalism and, in particular, the consequential information asymmetries that resulted from the separation of business ownership from its management. Since then, financial reports have been a primary means by which corporate management account for tenure in office.

Over the course of the 20th Century, financial reporting evolved from a relatively simple practice, primarily of interest to a small group of stakeholders, into a highly complex activity that is of considerable interest to many throughout modern societies (Baker & Wallage 2000, p.174; Crowther 2000, p.1843). In the first half of the century, the disposition of communication was internal and retrospective, reflecting the primacy of a stewardship function that underpinned agency relationships between managers and existing shareholders. Over the course of the second half of the century, the orientation of financial reporting broadened to acknowledge wider stakeholder constituencies beyond existing shareholders. Corporate Social Reporting (CSR) became more prominent in the 1940s following a swing away from the ideology of individual liberty to ideology based on social responsibility (Chen, 2000). Since then, CSR has experienced periods of popularity and hostility depending on prevailing political currents and the voluntary actions of large organisations (Gray, 2001).

These developments, combined with very substantial increases in the economic significance of corporate entities and the complexity of business transactions, have maintained the debate as to the nature of corporate accountability and the role of

financial reporting. On one side of the debate are those who suggest that the principles of individualism and capitalism operating in free markets can be relied upon to assure adequate financial accountability. Mouck (1994) refers to this perspective as a '*world view of enlightenment liberalism*', exemplified by Benston (1982) and Watts and Zimmerman (1986). On the other side of the debate are those, such as Gray (2001), who regard the enlightenment liberalism of the 19th Century to be the undesirable conservative view of 21st Century corporate accountability. Social accounting assumes that capitalism and corporate accountability, although originally based on classic liberal economic principles, are reformable and that appropriate evolution of financial reporting can produce substantial and beneficial change.

One effect of the increasing economic significance of business entities, the complexity of transactions and the expanding scope of corporate accountability is a substantial increase in the volume of corporate information published in recent decades (Andersen, 2000; Ashbaugh, et al., 1999). Yet the volumes of financial reports paradoxically run the risk of increasing rather than decreasing information asymmetries due to data overload (Andersen, 2000). Furthermore, many involved with small and medium-sized enterprises bemoan the cost of financial reporting compliance that requires the production of information that may never be read. The ongoing challenge for financial reporting is therefore to implement a reporting framework that facilitates the accumulation and dissemination of low cost information that meets the dynamic accountability demands of diverse stakeholders.

The next section considers the nature of technology and its role in potentially resolving the challenges that financial reporting faces in the 21st Century.

2.3 Technology and the rhetoric of technological determinism

2.3.1 Technology and teledemocracy

Technology, in all its various forms, is knowledge, whether in the form of individual experience, techniques handed on from person to person, tangible assets, patents, engineering drawings or even theories (Littler 1988, p.5). It is oriented towards applications and a technology's inner workings need not be understood in order to use it. In short, technology is practical knowledge of how to do and make things. It may be embodied in products and process hardware or it may be in the form of techniques. The meaning of technology has expanded from something relatively precise in the nineteenth century to Littler's (1988) all-encompassing explanation by the end of the twentieth century (Winner 1989, p.8). The so-called 'Technological Revolution' of the second half of the 20th century was characterised, not by the mere occurrence of technological developments, but by (i) the extent to which the newer technologies increasingly incorporated computing power and telecommunications systems as inherent parts of the new 'ways of doing things' and (ii) the speed at which new technologies were developed, introduced, accepted, embedded and then replaced by newer technologies.

Arterton (1987) refers to the use of advanced communications technology to facilitate the transmission of political information and opinion between citizens and their public leaders as 'teledemocracy'. Five characteristics of teledemocracy are: (i) greater volumes at increased speed and reduced costs, (ii) substantially larger numbers of channels, (iii) possibilities for greater diversity of speakers through mass media, (iv) specialisation in the audiences and (v) enhanced interactivity. Enhanced citizen

participation, facilitated by communications technologies, is the central feature of teledemocracy. Advocates of teledemocracy argue that current institutions prove increasingly incapable of dealing with the demands of a large and ever more complex society. The arguments are therefore that (i) the engines of political revolution are technologies themselves or (ii) communications revolution will generate a new social class that will restructure political institutions to its liking (Arterton, 1987).

At first glance, the concept of teledemocracy appears to provide a neat technological solution to a number of the challenges with which financial reporting currently grapples. Stakeholders are increasingly required to have the wherewithal to receive and process large volumes of corporate data and to interpret the resultant information⁴. The development and application of teledemocracy-type computer technologies would arguably equip financial reporting with the principles of a strong democracy and would facilitate interpretation of larger volumes of information by all stakeholders. Conceptually at least, computer and telecommunications technologies appear to enable financial reporting to handle the dynamic complexities of democratisation and accountability.

2.3.2 The rhetoric of technological determinism

Rhetoric is the skill or art of using language persuasively (Dictionary.com, 2010c). It is used to persuade others and ourselves that some position, belief, solution or perspective is the most ‘appropriate’, ‘viable’, ‘plausible’, ‘credible’ or ‘truthful’. Through such linguistic persuasion, agreed meanings and significance of phenomena are established

⁴It is a capacity to organise and process facts that distinguishes information from mere data (Romney and Steinbart 2006, p.5)

(Young, 2003). The process of rhetorical persuasion is related to human concepts of understanding and interpretation. Rhetoric is an '*aspect of the linguistic basis of the human world*' (Mouck, 1992). People are born into a reality that is already linguistically classified and ordered, and in which social interaction and development is through language.

Rhetoric is frequently regarded as a pejorative term, its application intended to suggest that a communicator is deliberately attempting to cloud rather than clarify understanding, or is disingenuously attempting to persuade an audience to some self-serving end. This interpretation of rhetoric, which suggests it is devoid of substance, has more in common with self-promotion than persuasion. In contrast, rhetoric based on '*sound argumentation*' (Norreklit, 2003; Young, 2003), whereby a communicator provides, *inter alia*, logical and empirical support for claims made, allows rhetoric to be treated as a valid epistemic mode of inquiry. It is a valid means by which we can justify what we think we know. As Young (2003) states, '*rhetoric is not [itself] a mode of truth...[it] is a means by which we are persuaded that any mode of inquiry, including that of science, is a mode of truth.*'

Eighteenth and nineteenth century political rhetoric proposed that liberty and human progress depended on economic independence, which was in turn, guaranteed by technological progress (Smith 2001a, p.4). This illustration of a social phenomenon being causally determined by preceding technological events is referred to as technological determinism. However, whether technological developments are the cause or effect of social change, or some mix of both, is a debateable matter. Opinions on the degree to which it is perceived that technology exerts societal influence range

along a continuum. The continuum may be categorised to identify four main stances: hard, soft, socio-cultural and voluntarist (Smith & Marx 2001, p. xii; Chandler, 1996)

(i) Hard determinism

The power to effect change is attributed to technology itself. Hard determinists foresee a future in which social choice is determined by the inherent attributes of technologies. The steady growth of technological power is just another self-evident feature of modern society, an obvious fact that calls for no further comment – technical innovations appear and cause important things to happen (Smith, 2001a). Technophiles view the future as one of progress and technologically enabled free choices. The assumptions underlying the optimistic viewpoint are that technologies are inherently egalitarian and neutral, that technologies will radically change the workplace for the better and that technologies will enhance democracy (Gurak, 1995). Technophobes, on the other hand, only foresee totalitarianism (Smith & Marx 2001, p.xii).

(ii) Soft/Socio-technical

Technology is a key factor that facilitates rather than causes changes in societal organisation (Chandler, 1996). Soft determinism is embedded in a larger social structure and culture. Technology does not have the inherent ability to be an independent agent of change (Smith & Marx 2001, p.xiii). However, once a technology is developed, its determinative effectiveness may then be sufficient to drive the course of subsequent events. As such, it is a second order agent of change. Soft determinism therefore differs from hard determinism in that it proposes that social choices both shape and are shaped by technological choices.

(iii) Socio-cultural

Technologies are subordinate to their development and use in particular socio-political, historical and culturally specific contexts. This is the stance of many modern sociologists (Chandler, 1996). They do not view technology as an innovative, and often singular, force on culture. They do not accept that cultural values and social change lag behind technology's leadership nor would they credit technology as a key factor in societal change. Technology is best understood as woven inseparably into the fabric of larger, political, social and economic contexts.

(iv) Voluntarist

This perspective emphasises individual control over the technologies that they see themselves as 'choosing' to use. However, the pervasiveness of technology in modern society makes this perspective, in practical terms, untenable.

Thus, it is reasonable to consider the possibility that inevitable social progress caused by technological development is a myth. Hard determinism has gained currency only because it is possible to visualise a historical progression of technological developments. It is perhaps only the tangibility of technology, as opposed to more abstract forces such as socio-economics, politics, culture and ideology, that can make technological development seem to be the necessary pre-condition of change (Smith & Marx 2001, p.x). While Sussman (1997, p.xiii), for example, acknowledges that '*in liberal democratic societies, many opportunities for social empowerment have been enhanced with the aid of new communication and information tools*', he also states that '[hard] technological determinism repeats the fallacy that technologies are the change

agents of history and disregards the human actors involved in public and private decision making'. In short, blind faith in technology may serve only as a poor substitute for a more participatory democracy (Smith 2001b, p.38).

Heilbroner (2001, p.72) suggests that 'hard' technological determinism resonates most forcefully in a liberal capitalist society because technological determinism is compatible with economic determinism. This suggests that technological developments can depend on particular socio-political points of view and may be framed, therefore, by ideologies (Dillard 1991, p.9). This, in turn, can create a circular and mutual reinforcement of socio-political philosophy and technological development. For example, in a liberal democratic environment, the technologies that are developed and diffused are those that are more likely to support a liberal economic philosophy. Any subsequent economic advances are likely to be attributed to the same technologies and used as an argument for further technological developments (that are underpinned, of course, by the same political principles). It may be argued, therefore, that the direction of technological advance is, at least partially, the result of social policy because technological advances depend in part on the rewards, inducements and incentives offered in that society.

Thus, greater awareness of the consequences of technological choice rather than passive acceptance of what may be unintended consequences is required (Winner, 1989). Furthermore, as the use of technologies becomes routinised over time, choices over the ways in which technologies are used and developed may be unknowingly accepted (Chandler, 1996). Arterton (1987, p.27) acknowledges that allowing technological change to continue apace, unexamined and unfiltered by societal values is unlikely to strengthen democracy. It follows that technologies, in fact, may only be as democratic

as a society allows them to be (Gurak, 1995). Societies, if they are to be truly equitable and effective, must understand precisely what sorts of implications new technologies may carry with them before they are introduced. Historically, technological developments have been rhetorically associated with democracy and societal progress in order to promote models of accountability that are underpinned by particular brands of politics and ideologies. If the rhetoric of technological determinism can be contested, then assertions regarding the effects of technological developments, such as the democratisation of financial reporting, are similarly contestable.

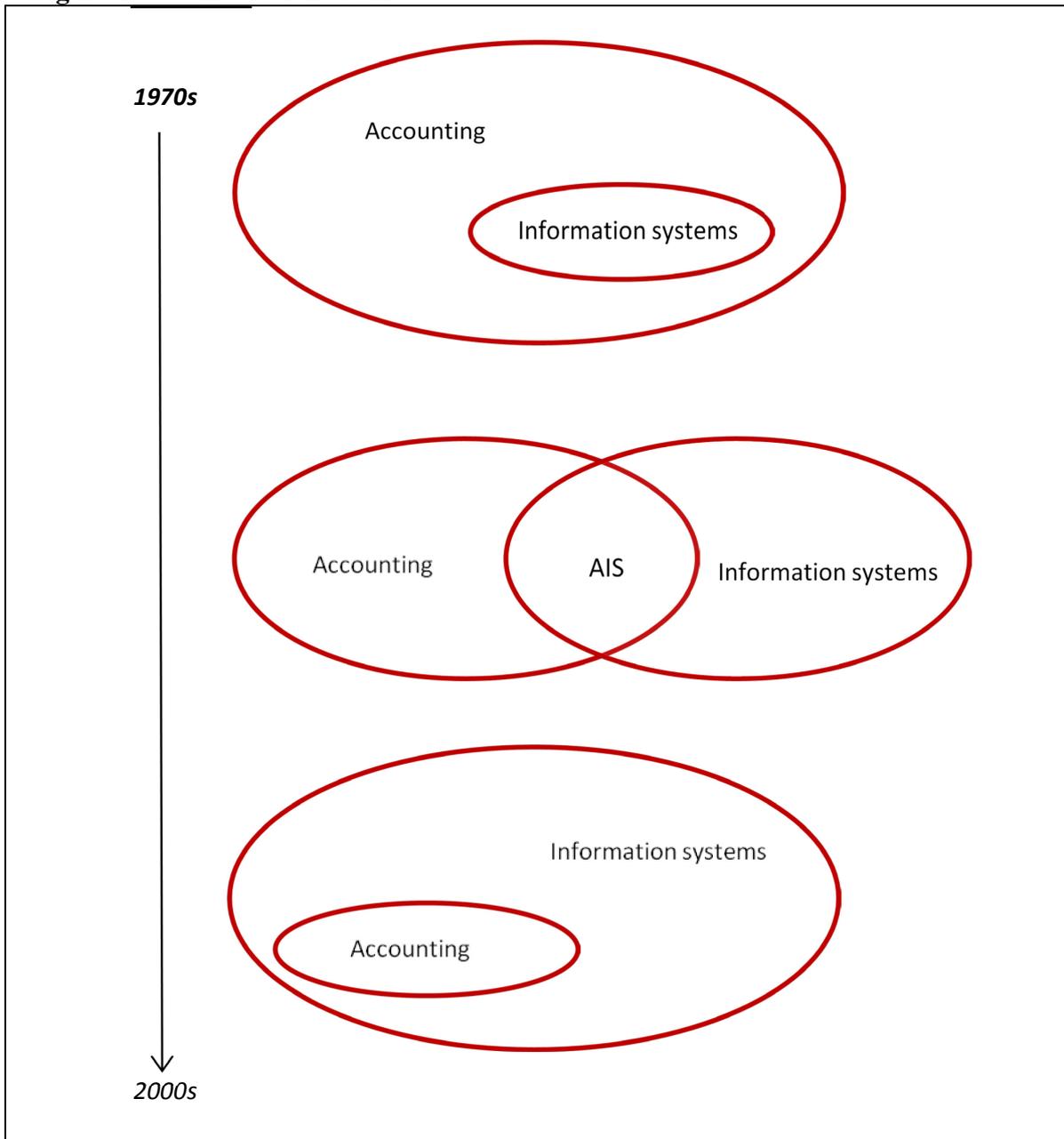
With this in mind, accounting literature that has concerned itself with the development and introduction of new information technologies is reviewed.

2.4 The technology of financial reporting

Accounting and financial reporting are no different from many other aspects of modern life in that they have been permeated by computing and communications technologies. Both accounting and financial reporting can be classified as technologies because, with reference to Littler's (1988) explanation of 'technology', they represent ways of capturing and communicating business information. Since the introduction of Visicalc (the first spreadsheet application) in the late 1970s, technological developments such as desktop and server computing, software applications for financial accounting, distributed file sharing and network connectivity (most recently exemplified by cloud computing) have and are manifesting themselves as part of what constitutes modern financial reporting practice.

The evolution of accounting technologies spawned AIS as a teaching and research discipline in its own right. Indeed, accounting can be increasingly perceived as a sub-discipline of IS (Sutton & Arnold, 2002). IS was originally regarded as a sub-discipline of accounting on the basis that, in the early stages of computerisation, the accounting systems were frequently the first to be automated in organisations. However, as many other functional aspects of organisations, such as marketing, human resources and operations became computerised, IS matured to become an independent discipline. Figure 1 summarises the evolution of accounting as a sub-discipline in the domain of IS:

Figure 1: Evolution of AIS



Source: Arnold and Sutton (2001)

Computerised accounting information systems were, by their nature, originally oriented towards internal organisational systems. As such, in accounting terms, the focus was on management accounting rather than financial reporting. However, the gradual expansion of network capabilities beyond organisational boundaries, leading ultimately

to the internet and cloud computing, is the mechanism by which AIS, as a research discipline, has expanded further to incorporate IFR and XBRL.

2.4.1 Information technologies, the internet and financial reporting

Xiao, et al., (1996, p.204) identify three dominant areas of research concerning IT and accounting: (i) the use of IT in accounting, (ii) the practical effects of IT use on accountants, and (iii) the benefits of IT use. Xiao, et al., (1996, p.206) acknowledge that the literature '*touches on human and social issues*' but are nevertheless critical of the absence of theoretical guidance. Further weaknesses identified were that research studies oversimplify the relationship between IT and accounting (assuming a uni-directional 'impact' of IT on accounting), are largely descriptive in their findings and barely refer to existing accounting theory. The absence of theoretical guidance is, to some extent, understandable given that some studies were commissioned by professional bodies and therefore oriented more towards practical solutions rather than development of theory.

A review of accounting literature from the mid-1990s onwards in relation to IFR reveals many of the same research issues that Xiao, et al., (1996) identifies. The internet is commonly presented in accounting literature as a solution to the financial reporting problem of how to produce low cost information for diverse stakeholders and there are numerous assertions of the democratisation of financial and corporate reporting (Wagenhofer, 2007; FASB, 2000; Andersen, 2000; Trites, 1999; Lymer, 1999; Baldwin & Williams, 1999; Spaul, 1998; Tapscott, 1996). There is, however, scant empirical evidence to support suggestions of a financial reporting revolution based on internet multi-media technology. Numerous descriptive studies confirm Adobe Acrobat

Portable Document Format (PDF) as by far the most commonly used electronic document format. While PDF documents electronically replicate and preserve the attributes of source paper-based equivalents using a universal electronic file format, few if any of the purported advantages of IFR are actually realised. IFR has remained largely a PDF file distribution channel rather than a distinct financial reporting communication channel. Thus, although there is evidence that stakeholders prefer the idea of IFR satisfying their information needs beyond the provisions of paper annual reports (Beattie & Pratt, 2001), IFR falls well short of the technological potential originally envisaged in professional and academic accounting literature (Debreceeny & Gray, 2001).

Much of the accounting literature that has investigated developing relationships between IT and financial reporting since 1995 may be categorised as descriptive/explanatory (Marston & Polei, 2004; Xiao, et al., 2002). For example, research confirming the existence of corporate websites, identifying the nature, content and presentation of financial and related reports, and investigating whether, for example, company size, ownership structure, profitability, debt, leverage or country listing may be an explanatory variable have formed the basis of numerous studies⁵. It is acknowledged that observational descriptive literature goes some way to understanding a relationship between financial reporting and IT. To this extent, this type of study contributes to a ‘theorising process’ (Weick, 1995), whereby individual studies assist in clarifying emergent theory.

⁵See Table 1 in Smith & Pierce (2005) for a comprehensive list of descriptive studies of IFR.

A second identifiable type of research examines the possible implications of technological developments for auditors and regulators (examples being Khadaroo, 2005; Lymer & Debreceeny, 2003; Fisher, et al., 2000), and a third type comprises discursive, speculative material which, as Xiao, et al., (2002) state: *'commence[d] a debate [that]... pose[s] more questions than...provide[s] solutions'*. Examples include PricewaterhouseCoopers, (2002), FASB, (2000) and Lymer, et al., (1999). Perhaps Jones & Xiao (2004, p.237), in their forecast of financial reporting on the internet by 2010, come close to describing the 2010 reality: *'the consensus view was that the financial reporting package would evolve into a core of general purpose, standardised information (in both the hard copy and Internet version) together with a non-core of general purpose and customised information. Radical changes suggested by prior studies, such as real-time reporting and disclosure of raw data, will not occur, at least to the core package. Auditors will be reactive and cautious, and regulators will adopt a minimalist approach. The fundamental dilemma of financial reporting in the internet environment will be between standardisation and customisation.'*

There are instances of accounting IFR research based on constructivist and critical research philosophies, but they are less common than the descriptive/speculative body of work. The principle of contingency theory of organisations recognises that the opportunities and challenges of IT derive not only from technological considerations but may also be conditional on cultural, economic, political, organisational and social factors (Rowbottom, et al., 2005; Xiao, et al., 2002; Xiao, et al., 1996). Unerman and Bennett (2004), Craig, et al., (2001) and Crowther (2000) adopt critical perspectives to give greater weight to social and political factors. Adopting methodological perspectives that are underpinned by the principles of social constructivism allow the

authors to challenge conventional wisdom regarding the benefits and beneficiaries of IT. They consider the possibility that IT has the potential to *'be a form of social action control over the minds of people'* (Craig, et al., 2001), *'reinforce[s] capitalist hegemony'* (Unerman & Bennett, 2004), or whether, in the case of IFR, it is more liberating for corporations than for individuals (Crowther, 2000).

Nonetheless, the limitations of the IFR research are similar to those set out by Xiao, et al., (1996) and Sutton (1992) in relation to accounting IT and early AIS research respectively: (i) an almost total absence of theory, (ii) a predominant focus on descriptive studies of practice and (iii) limited analysis of data yielding little insight into meaningful relationships. The AIS research contributions are limited because researchers applied new technologies to problems without fully understanding them and, as a result, academic contributions were negligible (McCarthy, et al., 1992; Sutton, 1992). David, et al., (1999) state in the context of AIS that research should evolve from an understanding of the domain, not from the mere availability of a new technology. Debreceeny and Gray (2001) outline several areas of research opportunities that arose from IFR but evidence of financial reporting conceptual frameworks being affected by the research output of accounting IT research remains difficult to find.

2.4.2 Innovation and technology acceptance studies

In terms of research models that could be helpful in terms of understanding the relationship between emerging technologies and financial reporting, innovation and technology acceptance studies provide a potentially useful repository of literature. Diffusion of innovations theory sets out how and why new technologies spread through

societies (Rogers, 1995). Innovation studies of this type are undertaken primarily from a sociological perspective and have influenced technology acceptance research models.

There are several models of IT acceptance, the most popular of which is the Technology Acceptance Model (TAM). The objective of the TAM, developed originally by Davis (1989), was to develop better measures for explaining and predicting the use of emergent technologies. It is based on principles adopted from Fishbein and Ajzen's (1975) attitude paradigm from psychology, which specifies how external stimuli, such as a new technology are causally linked to beliefs, attitudes and behaviour. The popularity of TAM is evident from a review undertaken by Lee, et al., (2003) which indicated that '*10% of the total publications*' in the IS field are TAM studies. Efforts to unify the various models of user acceptance of IT include the Unified Theory of Acceptance and Use of Technology (UTAUT). The UTAUT is purported to '*provide a useful tool for managers needing to assess the likelihood of success for new technology introductions and helps them understand the drivers of acceptance*' (Venkatesh, et al., 2003). The literature commonly identifies (i) perceived usefulness and (ii) ease of use as significance factors that explain the acceptance or rejection of new information technologies.

The technology acceptance literature demonstrates that the realisation of the purported benefits of new technologies should not be regarded as a foregone conclusion. Some technologies develop and mature as forecast, others mature but not as originally envisaged and plenty do not develop at all. Whereas technology acceptance studies are commonly found in IS literature generally, they do not appear to be as significant a feature of the financial reporting literature that pertains to emerging technologies.

Descriptive and speculative accounting studies appear to be rarely followed up on a longitudinal basis to establish whether and how financial reporting technologies mature (or not as the case may be). The initial rhetoric of how it is anticipated that financial reporting will change because of this or that technology is largely left unchallenged over time.

In this context, the literature of XBRL, an emerging technology that, allegedly, democratises financial reporting is now examined.

2.5 Extensible Business Reporting Language (XBRL)

“One of the objectives of XBRL is the reduction of information asymmetry resulting from incompatible global reporting formats. In other words, XBRL theoretically should ‘level’ the disclosure playing field, allowing any type of investor to evaluate financial statement information across a large number and differing sizes of firms” (Premuroso & Bhattacharya, 2008). The possibility of achieving this financial reporting objective underpins many of the claims for the adoption of XBRL. It helps to explain why it has been referred to as *‘a more significant change than the change from paper and pencil analysis to electronic spreadsheets’* (Williams, et al., 2006) and having *‘consequences similar to the invention of paper and the printing press’* (Covaleski, 2000).

The benefits to corporate governance generally, and financial reporting particularly, that potentially result from XBRL are well documented. There are claims of:

- How vital XBRL is to the democratisation of information, financial reporting and financial markets (Weverka & So, 2008; Cox, 2006; Dizard, 2006; Debreceeny, et al., 2005; Richards & Tower, 2004, Daniels, 2004; Covaleski, 2000);

- How financial accounting and reporting potentially constitutes a revolution or paradigm shift in corporate and financial reporting for the 21st Century, (Sinnott, 2006; Romney & Steinbart, 2006; Cohen, et al., 2005; Richards & Tower, 2004; Higgins & Harrell, 2003);
- How XBRL could complement the standardisation of International Financial Reporting Standards (IFRS) and enhance competitive advantage (Premuroso & Bhattacharya, 2008; Daniels, 2004);
- How XBRL is a potential solution to legislative requirements such as the Sarbanes-Oxley Act of 2002 or the requirements of European Union corporations to comply with IFRS (Premuroso & Bhattacharya, 2008; Pinsker & Li, 2008; Baldwin, et al., 2006);
- How XBRL could potentially lower the cost of capital (Pinsker & Li, 2008; Premuroso & Bhattacharya, 2008);
- How XBRL generally improves reporting practices, enhances corporate governance, saves time, lowers costs, enhances the qualitative characteristics of financial reporting information and can assist non-professional investors with their investment decisions (Pinsker & Li, 2008; Premuroso & Bhattacharya, 2008; Williams, et al., 2006; Hodge, et al., 2004);

It appears that financial reporting could be significantly affected by the emergence of XBRL technology. Assertions of democratisation of information, financial reporting and financial markets are complemented by equivalent rhetorical claims as to the likely effect of XBRL. The motivations of those asserting the democratisation of financial reporting (and equivalent rhetoric) vary. Christopher Cox is a former Chairman of the Securities and Exchange Commission and supported the development of XBRL for SEC

purposes. It is not unreasonable to suggest that, but for Cox, the SEC might not be implementing XBRL. Pinsker & Li, (2008) and Premuroso & Bhattacharya, (2008) are illustrative of descriptive academic XBRL research that is justified on the basis of rhetorical claims such as the democratisation of financial reporting and revolutionary change. Weverka & So, (2008), Daniels, (2004), Cohen, et al., (2005) and Covaeski (2000) are representative of parties who have a commercial interest in the development of XBRL and are therefore inclined to exaggerate both their knowledge and capabilities for the purpose of promoting themselves and XBRL. Established accounting researchers such as Debreceeny, et al., (2005), Baldwin, et al., (2006) and Hodge, et al., (2004) are more discursive as to the possibilities for XBRL and, notwithstanding assertions regarding XBRL, offer a more balanced view. However, regardless of the sources of XBRL literature, there is a pattern of XBRL literature rhetoric that is similar to the technological rhetoric in AIS and accounting IT literatures. One immediate question is therefore whether the research issues associated with AIS and accounting IT literature are also evident in XBRL literature.

2.5.1 The rationale for XBRL

There are innumerable software languages that can enable communication between computers. However, any given computer must be configured to understand a particular language in order to work with data expressed in that language. The configuration of a network of computers within organisations presents issues for management in terms of ensuring efficient electronic communication but these issues can generally be resolved by the implementation of appropriate and consistent IT policies. However, communication of data and information to external parties presents communication

issues that are not necessarily within the control of the organisation. Financial reporting, which by its nature is externally oriented, exemplifies a communications process during which these issues typically arise.

External communication of financial information frequently involves various software applications that may be (i) non-interoperable⁶, (ii) limited in terms of facilitating analysis or interrogation of the contents⁷, (iii) limited in terms of validating data integrity⁸, or (iv) some combination thereof. These issues arise because, notwithstanding the fact that computers may be physically networked (over the internet or otherwise), they may not be using a common language or, if they are, it may not be a language that meets the varying analytical and integrity requirements of diverse stakeholders in a financial reporting process. This was confirmed by Debreceeny and Gray (2001) who critically highlight the limitations of the internet as a useful financial reporting technology: *'Financial information on the web is already ubiquitous. It has been brought to the internet without the involvement of the accounting profession, accounting standard setters, or security regulators. The inconsistent presentation of financial information by corporations, the vast scale of the internet, and the inherent*

⁶For example, an electronic data file may be generated using a bespoke software application. Unless external parties have the same bespoke software application or an alternative application that has the capability to understand the bespoke data file, recipients of the file are obliged to re-input the data contents to another software application in order to work with the data.

⁷For example, Adobe Reader is a popular electronic equivalent of paper in that it captures and presents information in a fixed presentation format. However, it is not very useful for recipients who do not wish to be constrained by the presentation format used by the preparer of the file. Recipients may prefer to represent the data using a variety of presentation formats for analytical purposes. If recipients are constrained by the presentation format, they are obliged to re-input the data if alternative presentation formats are needed.

⁸In contrast to Adobe Reader, a typical spreadsheet application such as Microsoft (MS) Excel facilitates generation of data files that may be routinely edited by recipients as required. Notwithstanding the availability of functionality within MS Excel to restrict the extent to which file changes can be made, it is difficult to control the ownership, accuracy and integrity of spreadsheet data files.

limitations of HTML⁹ combine to mean that financial information on the web is very difficult to find and almost impossible to automatically retrieve even the most common of financial attributes'. Thus, whereas the internet increased physical connectivity, new financial reporting issues regarding software inter-operability, analytical capability and data integrity emerged to prevent financial reporting on the internet from realising much of the potential that was originally envisaged. It is claimed that XBRL can address these particular electronic communication issues.

2.5.2 The nature of XBRL

'Extensible Business Reporting Language (XBRL) is a language for the electronic communication of business and financial data.'

- <http://www.xbrl.org>¹⁰

XBRL is part of a family of XML languages. Extensible Markup Language¹¹ (XML), which is the World Wide Web Consortium's (W3C's) standardised language for the description and exchange of general information over the internet, led to an interest in the best way to describe and exchange business and financial information specifically (Williams, et al., 2006). XBRL is therefore an XML-based standard that is specifically concerned with the efficient exchange of business and financial information. Its

⁹Hypertext Markup Language (HTML)

¹⁰This is the XBRL International website. XBRL International is a not-for-profit consortium of approximately 550 companies and agencies worldwide working together to build the XBRL standard and promote and support its adoption.

¹¹XML is itself based on Standard Generalised Markup Language (SGML), which was originally developed in the 1960s in an attempt to standardise electronic document mark-up. XBRL was therefore evidently borne of a wider historical technological progression that has been specifically applied to the subject domains of financial and business reporting.

purpose is to facilitate the efficient preparation, publication, exchange and analysis of financial statements and the information they contain (Baldwin, et al., 2006). XBRL achieves this by providing a system for tagging electronic financial information so that it can be given contextual meaning (Locke & Lowe, 2007a). As a result, the automation of financial information location and retrieval, which is the limiting factor for IFR, should be greatly improved (Debreceeny & Gray, 2001). Its distinguishing technological characteristics are as follows:

- (i) It is an open source technology

Open source software can be defined as computer software for which the human-readable source code is made available under a license that meets the Open Source Definition¹². This permits users to use, change and improve the software, and to redistribute it in modified or unmodified form without having to pay a license fee. It is often developed in a public, collaborative manner. As such, it is an alternative to proprietary bespoke or off the shelf software.

XBRL, being open source, is not proprietary to any particular organisation. It is the output of the collaborative efforts of interested parties (regulators, software developers, professional firms, academics, among others) that are channelled through not-for-profit organisations set up for that purpose.

The perceived advantage of XBRL, as an open source technology, is that software developers may configure their own proprietary software applications to understand XBRL. Once configured, parties who use different proprietary software applications

¹²Available at <http://tinyurl.com/y2yclph> [Accessed 30 June 2010].

may still communicate efficiently with each other on the basis that XBRL is the common communication language. The inefficiencies that would otherwise arise because of recipient parties having to re-input data are avoided.

- (ii) Recipients of information are not constrained in terms of presentation formats, thereby potentially facilitating the analytical requirements of stakeholders

Data files commonly include instructions for recipient software application as to how the contents of the data files are to be consumed¹³. However, XBRL files do not contain any such instructions because processing and presentation of data file contents are matters for the recipients rather than the preparers of the files. Accordingly, because instructions are not typically included in the XBRL data file, configuration of a recipient's proprietary software application must include instructions on how to process the contents of an XBRL data file. In other words, recipients receive XBRL data streams, but how the recipients convert the data to useful information is a matter for each to consider and resolve.

The perceived advantage for file preparers is that a single XBRL file can theoretically meet the varying needs of multiple stakeholders¹⁴. Preparers benefit from the possibility of preparing a file only once but using it several times. Recipients also potentially benefit because they (i) are not constrained by any particular report presentation format, and (ii) can configure their own software applications to process

¹³For example, MS Word data files contain instructions for the Word software application as to spacing, fonts, sequence, tables, etc, as a result of which the data is presented to the recipient as originally determined by the preparer.

¹⁴For example, a single XBRL file may contain all the data required by a tax regulator, financial reports regulator and financial analyst. The preparer could therefore submit the same single file to all of the stakeholders rather than being obliged to prepare special purpose formatted reports for each stakeholder.

the data efficiently. In short, a reporting system based on XBRL explicitly separates the data from how it is presented, thereby freeing up the ways in which the data may be presented and analysed by recipients.

(iii) Significant file validation capability, thereby potentially facilitating the integrity requirements of stakeholders

As an XML-based language, XBRL is, by its nature, a mark-up language¹⁵ and leverages the features of XML. Two in particular are that (i) it can add structure and context to unstructured data, and (ii) the structure may be extended as required to mark-up new types of data (Hoffman 2006, p.48; Deane & Henderson 2004, p.9). This ability to extend language structure (extensibility) explains the ‘X’ in XML and XBRL.

Structure, and hence data validation, is determined by taxonomies. In general, a taxonomy is a body of information that is systematically defined and classified into a hierarchy of ordered groups according to relationships between the individual items of information (Dictionary.com, 2010d). An XBRL taxonomy specifically comprises a list of defined business reporting terms and expressions of relationships between those terms. Examples of XBRL taxonomies¹⁶ that are particularly relevant to financial reporting include the IFRS taxonomy, the US-GAAP taxonomy and the UK-GAAP taxonomy. Each purports to define and describe, in XBRL terms, the detailed elements of financial statements that may be required under IFRS, US-GAAP and UK-GAAP

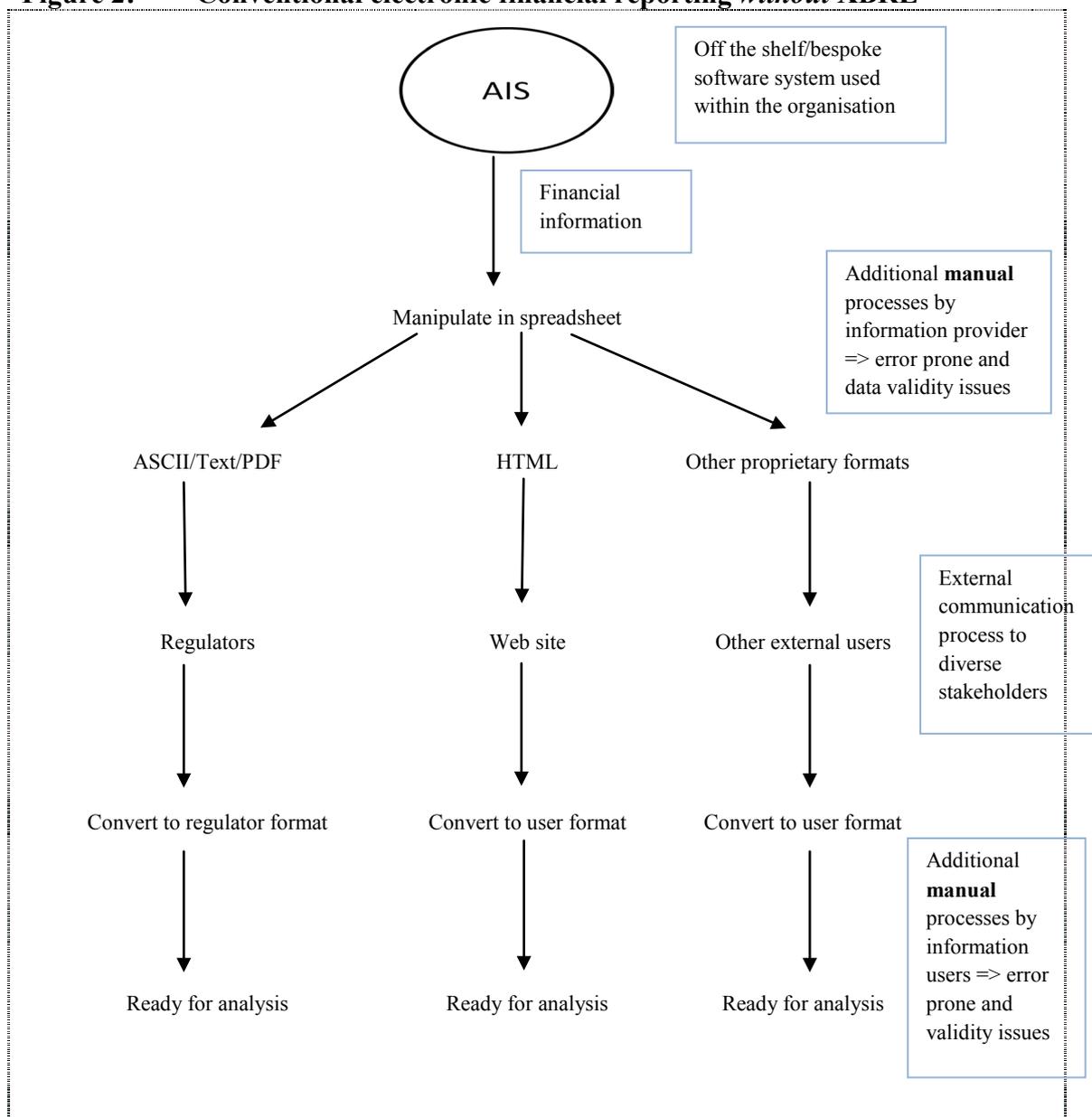
¹⁵Historically, newspaper or magazine articles would have been annotated or ‘marked-up’ during preparation in order to indicate text, spacing, size, font, etc. The principle of a coherent system of marking up in order to describe various aspects of electronic files underpins mark-up languages such as XML and XBRL.

¹⁶A list of taxonomies acknowledged by XBRL International is available at: <http://tinyurl.com/5a59cr> [Accessed 30 June 2010]

respectively. XBRL taxonomies provide abstract structure and meaning which can be subsequently associated with particular data values – this is what is meant by tagging data values. The point at which elements of a taxonomy are associated with data values is the point at which an XBRL file is created.

Figures 2 and 3 illustrate the differences that XBRL conceivably makes to the efficiency and integrity of an electronic financial reporting system.

Figure 2: Conventional electronic financial reporting *without* XBRL

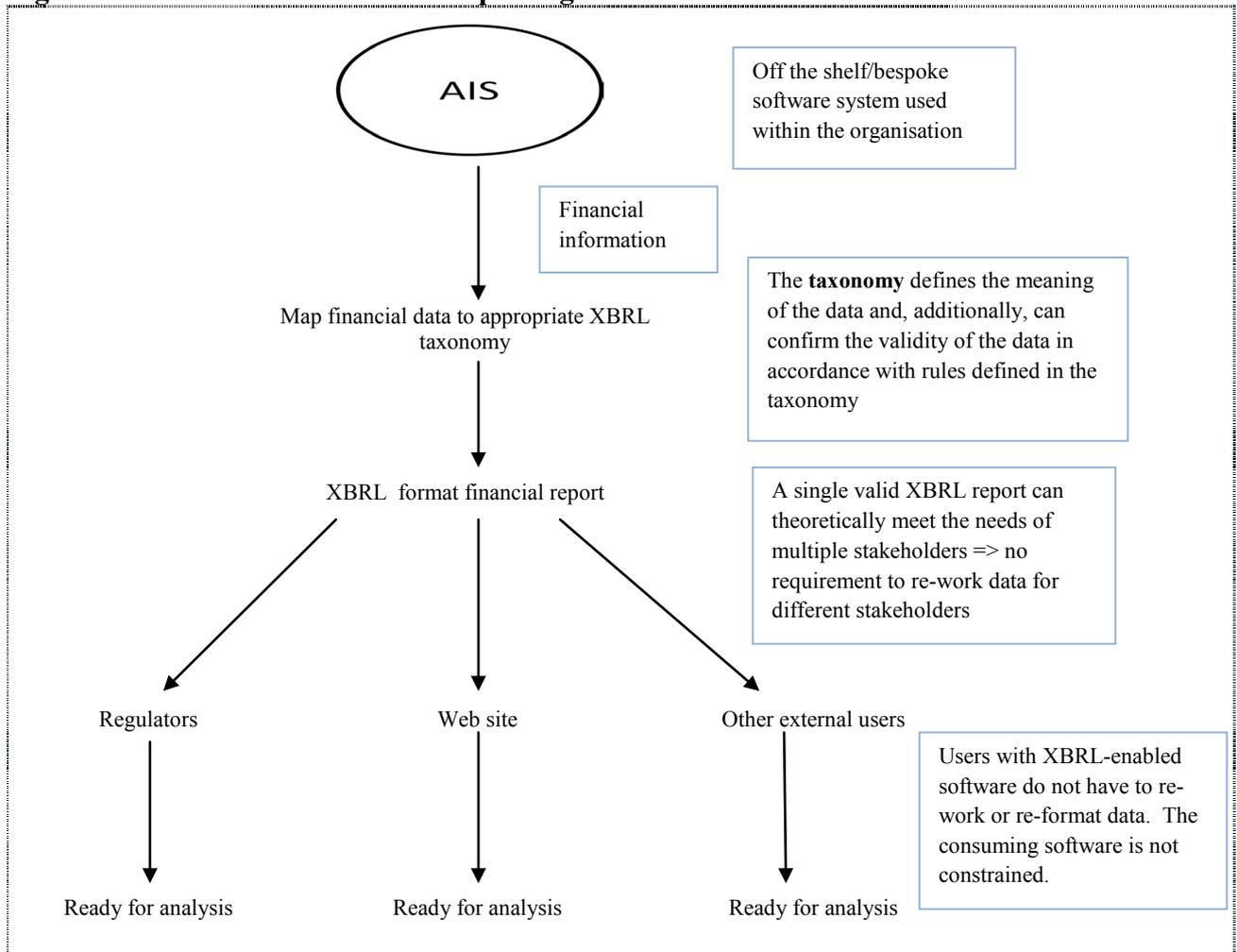


Source: Romney and Steinbart 2006, p.530, adapted

Figure 2 highlights the fact that once financial information moves outside the boundaries of an organisational accounting information system, necessary manipulation of the information can be both time consuming and error-prone due to the amount of re-working of data that may be required to meet the needs of diverse stakeholders. Many automatic checks and balances that are a standard part of accounting software applications become redundant once the information is extracted to separate software applications such as MS Excel spreadsheets. The inefficiencies of financial reporting are frequently experienced by report recipients who are obliged to spend time re-inputting or re-formatting data before it becomes amenable to useful analysis.

Figure 3 highlights the pivotal role of an XBRL taxonomy. Information extracted from structured accounting information systems is mapped to an equivalently structured taxonomy.

Figure 3: Electronic financial reporting with XBRL



Source: Romney and Steinbart 2006, p.532, adapted

In comparison to spreadsheets, the structure and integrity of the information can be retained and checked more easily. The outcome of mapping financial information to an XBRL taxonomy is an XBRL financial report file. By its nature, it is based on an open source electronic standard of communication so, assuming the proprietary software applications of potential recipients of the file are XBRL-enabled, the preparer should, theoretically, be able to send just one XBRL financial report to multiple recipients rather than having to prepare bespoke reports for individual recipients.

The benefits of XBRL to financial reporting stakeholders are based on a migration of financial reporting technologies from Figure 2 to Figure 3. Advocates of XBRL focus

on (i) the integrity of financial information that comes from mapping financial data to robust taxonomies, (ii) the time and cost saved by preparers and users of financial information due to the enhanced inter-operability of software, and (iii) the analytical efficiencies that are derived from the separation of presentation and content in an XBRL financial reporting system. It is acknowledged that, conceptually, XBRL-based financial reports can make a lot of sense in terms of removing what Bovee, et al., (2005) refer to as the '*friction*' of inefficiencies from financial reporting systems. However, the next section considers the practical challenges of implementing XBRL technologies.

2.5.3 The status of XBRL literature

'In the current research literature, XBRL is often presented as the panacea to problems associated with online business reporting. This presents a narrow view focussing on the online business reporting process itself, rather than on the broader issues associated with the creation, management and use of business information. Hence, the adoption and implementation of XBRL itself is then largely seen as unproblematic and taken for granted' (Williams, et al., 2006).

Much of the XBRL literature focuses more on the exciting outcomes and less on the mundane tasks actually required to implement an XBRL-based financial reporting system. For example, Baldwin, et al., (2006) optimistically state that '*once the [XBRL] system is in place, the incremental cost of generating an additional individual report will be low*' and make no further reference to how exactly the system will be put in place in order to lower incremental costs. Similarly, without any indication of how the outcomes are to be achieved, Premuroso and Bhattacharya (2008) assert that '*the addition of the XBRL infrastructure by firms is expected to reinforce and make it easier*

to implement and comply with the various provisions of the Sarbanes-Oxley Act of 2002' and refer to 'streamlining internal and external financial reporting [which]...in turn reduces the cost of compiling and reporting financial information'. The actual development of XBRL technologies and their deployment as part of robust financial reporting systems appear to be simplistically regarded as unproblematic.

It is acknowledged that a proportion of the XBRL literature is published in professional journals (Debreceeny 2007, p.5; Locke & Lowe, 2007b). This category of literature could be argued to be as much promotional as it is objectively informative. However, notwithstanding the rhetoric of potential benefits of XBRL in both academic and professional literature that resonates with the rhetoric of previous accounting technological developments, there is, as yet, a relative paucity of supporting empirical research (Pinsker & Li, 2008; Premuroso & Bhattacharya, 2008; Debreceeny, et al., 2005). Hodge, et al., (2004) gathered experimental evidence to support a conclusion that search-facilitating technologies, such as XBRL, aid financial statement users by improving the transparency of financial statement information and accounting policy choices. Premuroso and Bhattacharya (2008) produced evidence based on a small sample to support a conclusion that corporate governance is positively associated with voluntary use of XBRL. As is the case with similar financial reporting on the internet literature, these studies contribute to an emergent theorising process. It is also evident, however, that both studies perceive XBRL simplistically as a 'black box' technology.

Recall in Figure 3 that the critical components of an XBRL-based financial reporting system are the (i) taxonomy and (ii) software applications that can produce and consume XBRL reports. The existence and quality of these two components determine

the nature and quality of an XBRL-based financial reporting system. Furthermore, it is these components that are acknowledged to be relatively immature in technological development terms. Bovee, et al., (2005) confirm that the development of XBRL taxonomies is '*a difficult, laborious and controversial process*' and highlight the importance of having a methodology for evaluating them. The positive conclusion about XBRL reached by Hodge, et al., (2004) was subject to the explicit caveat that high quality taxonomies, computer literate users and robust software are all functioning parts of the financial reporting system. Baldwin, et al., (2006) acknowledge the complexities of taxonomies in passing and Debreceny, et al., (2005) draw attention to the practical challenges of developing robust taxonomies. Software developers face the equivalent challenges of incorporating XBRL functionality into their software applications. Even though XBRL has been in existence since 2000, it is only recently that XBRL-enabled mainstream software applications have started to become available (Locke & Lowe, 2007a). Furthermore, GAAP XBRL taxonomies such as the US-GAAP taxonomy (XBRL US, 2009) and UK-GAAP taxonomy (XBRL UK, 2009), in addition to the IFRS taxonomy (IASCF, 2010a), are all still under development to the extent that the benefits of their inclusion in large-scale financial reporting regulatory systems have yet to be proven. This status of the deployment of XBRL technologies contrasts starkly with the unbridled advocacy of XBRL as a concept.

Furthermore, the extent to which XBRL has been adopted by regulators has been somewhat exaggerated in the literature. Two higher profile XBRL implementations currently underway include (i) the requirement to submit certain submissions to the Securities and Exchange Commission (SEC) in the USA using XBRL, and (ii) the obligation to file corporation tax returns and with relevant accounts and computations in

the UK from 1 April 2011 onwards. In each case, the actual experience of implementation belies the assumed simplicity of implementation that is included in much of the accounting literature.

Baldwin, et al., (2006) present a table of regulatory authorities that purportedly utilise XBRL technology and the year during which XBRL was implemented. However, there are no distinctions between once-off projects, closed pilot projects for evaluation purposes or actual live persistent implementations of XBRL technology. Debreceeny, et al., (2005) encouragement of the SEC '*to consider adopting XBRL for Form 8-K filings*' is also somewhat incongruous given that there was neither empirical support nor a theoretical basis derived from successful equivalent financial reporting technologies to justify this encouragement. Debreceeny, et al., (2005) further state that '*we encourage the SEC move to requiring XBRL filings for financial statement for all filers. We also encourage the SEC to investigate employing XBRL taxonomies that incorporate both financial and non-financial performance information*'. It is difficult to reconcile this recommendation of XBRL with the research issues, taxonomy development issues and potential for manipulation that are set out in detail in the same paper.

It is concluded that much of the XBRL literature that is produced from an accounting perspective is similar, in terms of research issues, to the patterns noted by Sutton (1992) and Xiao, et al., (1996) in relation to previous accounting technological developments. New technological developments are too frequently perceived from an accounting perspective as objective 'black box' concepts that somehow produce positive results. The rhetoric of technological determinism, supported by references to contingent concepts such as democratisation, is implicitly accepted and used to gain rhetorical

advantage or justify research studies. There is an over-emphasis on descriptive and speculative type research at the emergent stage of development with insufficient reference to either extant theory or the practical challenges of implementation.

2.6 Conclusions

Whereas the utility of the content of financial reports is and has always been a criterion of quality, the ease and efficiency with which stakeholders can interact with reliable content is increasingly important given the volume of data that is periodically available. Thus, the technologies of modern financial reporting comprise not only the content but also its efficient communication to external stakeholders.

Computer and telecommunications technologies are perceived as solutions to the demand for high quality information. The internet and XBRL are two recent examples of technologies that are claimed to, *inter alia*, democratise financial reporting. However, as is evident from a review of the history of democracy, ‘democratisation’ may be ultimately an ideological matter of belief and interpretation. Similarly, although greater accountability may be the vision that is shared by stakeholders, the detail of how it is constituted may differ significantly. Thus, whether computer and telecommunications technologies democratise financial reporting is dependent on the interpretation of democratisation.

The dynamic nature of concepts such as democratisation and accountability means that high quality financial reporting is also a dynamic concept. Views as to what constitutes high quality financial reporting may change in response to prevailing views on accountability. As such, whether financial reporting is democratised may depend on

both the content of financial reports and the capabilities of new technologies such as XBRL to satisfy particular models of accountability.

This thesis posits that some accounting researchers prematurely assume, for research purposes, that emergent financial reporting technologies, such as XBRL, are mature, effective, embedded components of financial reporting systems. As such, the research variables are assumed to be objective and unambiguously defined. However, for technologies that are at the emergent stage of development, these assumptions are questionable. The matter of the democratisation of financial reporting should be tested rather than assumed.

Testing the democratisation of financial reporting presents research challenges because, at the emergent stage of technological development, the meanings of concepts and relationships between them may be subjective. From a research methodology perspective, the possibility that new technological developments are dynamic and contingent must be considered. For example, XBRL may be perceived differently by various stakeholders depending on area of interest and experience of XBRL. Its effect on financial reporting may depend on stakeholder interpretations of what constitutes financial reporting in an XBRL environment. Assertions of democratisation similarly depend on interpretations of the concept of democratisation. Until the technology matures sufficiently and the experiences of stakeholders converge, the significance of the technology and its interpretation by stakeholders may remain subjective. The implication for accounting research is that the research methodology should reflect the contingent nature of the phenomena under investigation. In short, immature

technologies cannot be presumed to be mature for the purpose of suiting a preferred methodological basis of research.

Regarding the rhetoric of democracy and technological determinism, it is not suggested that forecasts of new revolutionary financial reporting paradigms were disingenuous on the part of accounting researchers, or that notions of democratisation of financial reporting based on new technological developments are not actually believed by those who wrote of them. It is the case however that there was no subsequent development of sound argumentation, thereby preventing meaningful exploration of the validity of the underlying assertions, as might ordinarily be expected in a robust academic research environment.

The rhetoric of democratisation, and equivalent exhortations, reflect implicit assumptions of hard technological determinism and a premature preoccupation with means-end type research that focuses on what technology might do and the practical benefits that might be derived. There is insufficient emphasis on enhancing our understanding of the theoretical and practical financial reporting consequences of developing and deploying technologies such as the internet and XBRL. The absence of a comprehensive body of evidence to support the initial rhetoric reveals a disconnect between conceptual research propositions and the development of financial reporting practice. Opportunities for accounting researchers to truly understand and influence technological developments may be lost because, over time, many technologies become routinised and embedded in systems and are therefore less easily modified.

Furthermore, the perceptions that 'black box' emergent technologies somehow achieve enhanced financial reporting outcomes also limit the possibility of meaningful

contributions to financial reporting theory. As long as this perception persists, the evolution of financial reporting conceptual frameworks and accounting standards are less likely to consider communications technologies explicitly. Debreceeny (2007, p.9) illustrates this point with reference to remarks made by Chair of the IASB, Sir David Tweedie, at the 14th International XBRL Conference¹⁷: *‘In his address, Sir David Tweedie spent most of his time on developments with IFRS and convergence between US-GAAP and IFRS. He made much of the potential of XBRL to aid use of IFRS: “We at the IASB and IASC Foundation (our oversight organisation) view XBRL as an important tool that will enable these users to take full advantage of the increased comparability and transparency offered by IFRSs”. Not a word, however, on how XBRL might influence the setting of accounting standards’* (bold added).

In conclusion, the assertion that ‘XBRL democratises financial reporting’ is an illustration of empirical and methodological problem areas in financial reporting research. Implicit assumptions of hard technological determinism and insufficient consideration of the contingency of the emergent variables limit the quality of contributions to financial reporting theory and practice. It is posited in this thesis that much of the accounting research undertaken has not been methodologically equipped to research contingent concepts such as ‘democratisation’ or indeed to consider whether concepts such as ‘financial reporting’ and ‘XBRL’ may be perceived differently among stakeholders. The emergence of XBRL provides a research opportunity to investigate financial reporting using a methodology that specifically facilitates contingent

¹⁷Tweedie, D. (2006), *‘Remarks by Sir David Tweedie (Chairman, International Accounting Standards Board) to the 14th XBRL International Conference, Philadelphia, USA’*, [online] XBRL International. Available: <http://tinyurl.com/27otgdh> [Accessed 30 June 2010]

interpretations. Avoiding the rhetoric of democracy and technological determinism, XBRL is presented as merely the latest in a series of financial reporting technological progressions that happen to involve greater use of computers and telecommunications power. In other words, the nature and meaning of an already existing technology of financial reporting is examined anew in light of the emergence of XBRL. This perspective of a new technological development (XBRL) as an additional attribute to an already existing technology (financial reporting), and investigating a potential outcome (democratisation) avoids the unhelpful rhetoric that is evident in extant accounting literature. As Debreceeny (2007, p.7) states: *'Perception is reality when it comes to technology adoption and we need to understand this when we come to research XBRL'*.

Chapter Three sets out the detail of the research methodology and research methods.

Chapter Three: Research Methodology and Methods

3.1 Introduction

Research is guided by a research perspective or paradigm, comprising ontological, epistemic and methodological assumptions, which collectively, frame the nature and objectives of the research and the role of the researcher. The purpose of this chapter is to explain the methodological foundations of this thesis and to relate them to the research methods used to collect the data.

This chapter reviews the methodological basis of accounting literature and concludes that the predominance of objectivism based on ontological realism reinforces the rhetoric of democracy and technological determinism that are set out in the literature chapter. For the purpose of considering the dynamic nature of concepts such as ‘XBRL’, ‘financial reporting’ and ‘democratisation’, alternative ontological and methodological bases that are underpinned by constructivist principles are considered.

The methodological approach adopted in this thesis is ‘interpretive’ (Orlikowski & Baroudi, 1991) and is primarily based on Searle’s (1995) theory of institutional reality. The fundamental proposition within the selected research framework is that emergent technologies, such as XBRL, represent, in Rorty’s (1989) terms, potential metaphoric re-descriptions of a financial reporting social reality. The question of whether financial reporting is democratised within that social reality is presented as a question of whether it is an institutional fact (as defined by Searle (1995)). In other words, is there a collective intentionality on the part of social groups to assign financial reporting with the status of being democratised because of XBRL?

The primary method employed to interpret whether XBRL democratises financial reporting is Osgood, et al.,'s (1957) semantic differential. This method elicits connotative interpretations of concepts in order to assess whether the interpretations are sufficiently shared within and between social groups. On this basis, conclusions as to the epistemic status of the concepts may be drawn. This chapter explains the significance of the epistemic status of concepts and the mechanics of the semantic differential technique. A review of the semantic differential literature, with particular attention to accounting and IS researchers who have utilised the semantic differential technique is also presented.

This chapter concludes that an interpretive research framework is an appropriate methodological basis for (i) research emerging financial reporting technologies in general, and (ii) addressing the accounting research problems set out in the literature chapter specifically. Osgood, et al.,'s (1957) semantic differential is concluded to fit the objectives of the thesis and is consistent with the proposed research methodology.

3.2 The philosophical bases of academic research

Undertaking academic research means (i) that the study is undertaken within an articulated ontological and epistemic framework, and (ii) that the processes, methods and the techniques used have validity and are reliable (Kumar 1999, p.4). It follows that the philosophical and methodological underpinnings of this thesis must be considered in order to make explicit the choices that may be implicit in the research question and proposed methods.

The choice of research methodology depends upon the philosophical orientation of a researcher. This is something a researcher may not be fully cognisant of at the outset of a research project. Methodological choices are frequently presented in published research in a way that suggests the key decisions were routine or trivial. Perhaps due to pragmatic limitations on the lengths of published articles, explanations of the methodological options considered and justified are rare when compared to word counts allocated to literature reviews and data analyses. It could be inferred, reasonably but mistakenly, that consideration of methodological choices, either in prior literature or for the research question under consideration, ultimately makes no difference to findings or conclusions.

When conducting social scientific research, a researcher makes ontological and epistemic assumptions, either explicitly at the outset, or on an emergent basis throughout the project. It is incumbent upon a researcher to ensure the coherence of ontological and epistemic assumptions. Ontology is the study of 'being' or 'existence', and categories thereof. Ontological assumptions concern '*the very essence of the phenomena under investigation*' (Burrell & Morgan 1979, p.1). Different schools of thought debate whether, and the extent to which, reality is external to the individual or alternatively a manifestation of one's own consciousness. On one side, 'realists', contend that reality exists independently of conscious manifestation. Opinion at the opposite end of the spectrum (nominalist) posits that objects have no separate existence and that reality is no more than a collection of mental events undertaken by the human mind to describe and structure objects.

Epistemology concerns itself with theories of (i) how we gain knowledge and (ii) justifying what we think we know. It embraces beliefs about the foundation of knowledge and the development of understandings of reality (Brannick & Roche, 1997). Smith (2003, p.4) sets out three broad epistemic perspectives that are frequently found in accounting research. These are the scientific, interpretive and critical perspectives.

The scientific tradition emulates natural sciences research and has strongly influenced social scientific research (Hammersley 1993, p.10). It is typically characterised by ontological realism, an *a priori* definition of a theoretical framework and subsequent collection of empirical data for the purposes of testing and developing the framework. It can also be otherwise referred to as deduction or positivism.

An investigator adopting an interpretive perspective seeks to understand social reality by interpreting meanings that are shared by social groups. Realities are interpreted and theories evolve based on contextual consensus. This approach is sometimes referred to as phenomenology or induction. The investigator is less interested in developing all-covering theories that explain phenomena and more interested in the richness of contextual realities that are observed by the researcher and the researched. Theoretical generalisability is therefore not as important to the phenomenologist as to the scientist (Saunders, et al., 2000, p.86).

Critical perspectives extend the interpretive tradition to focus in particular on the ownership of knowledge and the associated social, economic and political implications. Critical theorists reject positivist efforts to construct an objective, empirical foundation of knowledge based on immediate senses (Held 1980, p.164). They claim that reality is a world of human interpretations necessarily based on historical experiences.

Furthermore, they assert that positivists do not appreciate that the process of knowing cannot be separated from the historical 'struggle' between individuals and society. Critical theorists investigate the contextual meanings of phenomena with an emphasis on the possibility that 'relations of domination' may result in the exclusion of certain types of meanings that might otherwise be present. The objective of the critical theorist is therefore to unearth the emancipatory potential of constrained meanings and actions (Held 1980, p.173).

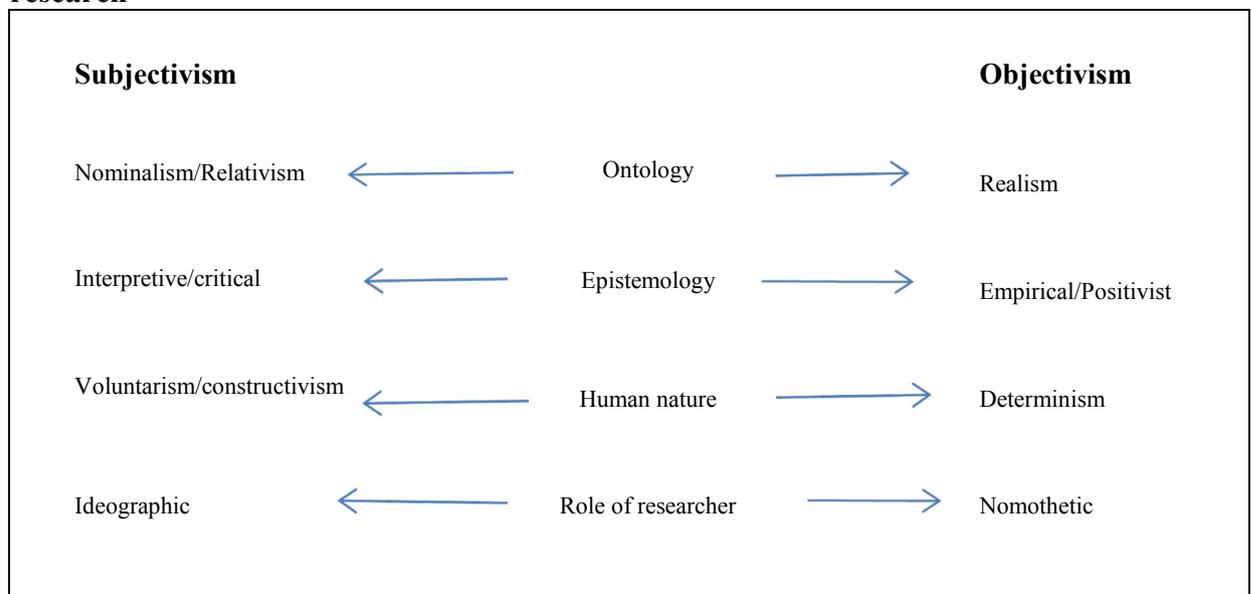
The preceding paragraphs indicate that empirical epistemic and realist ontological perspectives share a common philosophical foundation, as do phenomenology and nominalism. Research philosophies can be also distinguished in terms of human nature and the role of the investigator (Burrell and Morgan 1979, p.6). Human nature assumptions range between the determinist and the voluntarist perspectives. Determinism assumes that circumstances are dictated and constrained by the environment whereas voluntarism contends that man has complete free will. An obvious example is the technological determinism continuum set out in the literature chapter. Recall that extreme technological determinists assert societal circumstances to be dictated by technological developments whereas voluntarists claim individual free will and freedom to choose which technologies to develop and use.

In terms of the role of the investigator, Burrell and Morgan (1979) set out opposing nomothetic and ideographic approaches. The nomothetic approach is consistent with scientific and realist thinking in that the objective is primarily to establish universal laws based on *a priori* theorising. The investigator is regarded as a dispassionate observer during the project. On the other hand, the ideographic extreme considers that

knowledge can only be gained about a particular situation or context. This approach embraces the evolutionary nature of the research as it unfolds. The investigator is assumed ‘*free thinking and variable in perceptual skills and, rather than seeing this as a problem, it is built upon as a [research] strength*’ (Laughlin, 1995).

Figure 4 summarises the philosophical positioning of objectivist and subjectivist approaches to research.

Figure 4: The philosophical assumptions that underpin social scientific research



Source: Burrell and Morgan (1979, p.3), adapted

The bi-polar continua of Burrell and Morgan (1979) have been criticised as somewhat simplistic but is also acknowledged, by Laughlin (1995) amongst others, to be of assistance in terms of identifying research choice domains. As the range of possible philosophical choices and combinations may not be self-evident, it is helpful to refer to an objective framework in order to articulate the methodological foundations of any research project. Furthermore, Laughlin (1995) emphasises the ‘middle-range’ of the

continua in order to highlight the availability of choices between the extremes and, thereby, attempts to enhance the intellectual visibility of the middle-range possibilities.

3.3 Quantitative and qualitative approaches

Methodological choices include considerations of whether the data to be analysed and interpreted are quantitative or qualitative in nature. During the 20th Century, practically all of the social sciences experienced a quantitative revolution (Hammersley 1993, p.39). The apparent successes of research approaches searching for universal truths in the natural sciences resulted in a predominance of social scientific research designs that similarly focussed on concept measurement, causality, generalisability and replication. The rigour and unobtrusive nature of quantitative analyses intuitively suggest a good fit with positivist epistemologies. However, as Bryman (1988) points out, the *apparent* rigour of conclusions based on quantitative data can be misleading and the generalisability of quantitative research can be exaggerated. It is generally acknowledged though that the scientific method and quantitative research have contributed very significantly to knowledge.

Qualitative research has much in common with subjectivist perspectives. Investigating the richness of data in what may be an unstructured piece of research, with a view to working on emergent theoretical relationships, is the essence of qualitative thinking (Bryman, 1988). The use of theory as a precursor to an investigation is not always regarded as a necessity for the qualitative researcher as the concern may be to discover rather than to verify theory. Thus, the development of qualitative methods for use in the social sciences emerged to enable researchers to reflect and capitalise on complex

characteristics of the phenomena that are the object of enquiry. Figure 5 sets out the fundamental characteristics of each of quantitative and qualitative research approaches.

Figure 5: Characteristics of qualitative and quantitative research

	Qualitative research	Quantitative research
<i>Types of research problem</i>	How? Why? What?	Who? What? How many? How much?
<i>Nature of literature</i>	Exploratory/descriptive Complex constructs Identification of the variables Emergence of research questions	Explanatory/correlational/descriptive Variables already identified and established Hypothetical propositions
<i>Perspective/paradigm</i>	Interpretive/phenomenological	Positivist/empirical
<i>Methods</i>	Participative/interactive/adaptive	Unobtrusive/distant/structured
<i>View of society</i>	Dynamic, evolutionary, change	Static, constrained actors

Source: Perry (1998), adapted

Differences between the two approaches can be somewhat exaggerated, based on a simplistic assumption that they are mutually antagonistic. There are similarities and differences notwithstanding the presentation in Figure 5 (the purpose of which is to emphasise their distinguishing features rather than their similarities). The suggestion that they are distinct mutually exclusive epistemologies lies at the heart of the exaggeration of their roles (Bryman, 1988).

It is important, however, for researchers to explicate whether the adopted approach is an epistemic or technical matter. Bryman (1988) asserts that choices regarding quantitative and qualitative approaches are *prima facie* epistemic matters and that the epistemic beliefs of a researcher should therefore determine the approach. The counter argument is that the research issue should determine the style as certain questions simply might not lend themselves to being effectively addressed by quantitative or qualitative means, regardless of the philosophical perspectives of the researcher. One reason why it is necessary to elaborate on quantitative/qualitative choices (in terms of whether they have an epistemic or technical basis) is because of encouragement in the literature to combine quantitative and qualitative analyses, the argument being that combinations provide a greater variety of perspectives on the phenomena under investigation (Easterby-Smith, et al., 1991, p.31; Gable, 1994). However, distinguishing between quantitative and qualitative approaches in epistemic terms makes a combination of approaches more difficult to defend on the basis that to combine them is to fail to recognise the difference between a paradigm and a method. A technical perspective on quantitative and qualitative methods does not preclude combining them precisely because the combination is merely a matter of method (Bryman, 1988).

3.4 Constructivist theories of Truth and Reality

According to Bloor (1996), we are all ‘instinctive realists’. Our natural instinct is to treat reality as an objective external phenomenon to be addressed and understood by human senses. Perhaps it should be no surprise therefore that emergent computer and telecommunications technologies are perceived as objective deterministic phenomena. Chua (1986) states: ‘*There has been one general scientific world-view, one primary*

disciplinary matrix...These beliefs circumscribe definitions of worthwhile problems and acceptable scientific research. To the extent that they are continually affirmed by fellow accounting researchers, they are often taken for granted and subconsciously applied'. Chua's (1986) assertion regarding methodological choices in accounting research is complemented by the IS research findings of Orlikowski and Baroudi (1991) which confirm the predominance of positivist-type research.

Given the apparently taken-for-granted philosophical basis of positivism, many accounting researchers evidently preferred to operate within the logical empiricism of the scientific method and the 'common sense' realism of accounting practice in the 1980s and 1990s and were reluctant to ponder such matters as ontology and epistemology (Mattesich, 1991). This may help to explain why financial accounting researchers have been insufficiently critical of the rhetoric of technological determinism that is commonly associated with emergent technologies. The validity of hard technological determinism is implicitly assumed and, in some cases, likely to be invoked as a justification of research studies. Given the explanations of the contingency of democracy, financial reporting, accountability and technological determinism in the literature chapter, it is concluded that financial accounting research of emergent technologies has been predicated on taken for granted assertions that are contestable but which have been insufficiently contested.

There were some who did consider ontological and epistemic matters, including those influenced by *'the linguistic turn that had begun to sweep through philosophy and the social sciences in the 1970s and was brought into the accounting literature in the 1980s and 1990s'* (Mouck, 2004). This type of scholar was well versed in the ideas of

hermeneutics, critical theory, post-modernism and post-structuralism, and therefore in a position to challenge mainstream academic accounting thinking. Mouck (2004) summarises a number of examples to illustrate the *'huge chasm between the realism of mainstream...researchers on the one hand and the social constructivism of [interpretive/] critical accounting researchers on the other'*.

Furthermore, in relation to investigations of IT, Vickers (1999), for example, recommends the *'avoidance of the positivist tendency to over-value left-brain, logical activities, characteristics and values, such as rationality, reductionism, determinism and mechanistic ways of thinking about human beings and organizations'*, and embracing *'qualitative approaches that value the rich, the grounded and the subjective'*. This suggestion is, of course, subject to the objectives of the research and the specifics of research questions. There should be an identifiable coherence between the framework within which research investigations are undertaken and the nature of the research questions to be investigated. This thesis posits that an interpretive research perspective is most suited to addressing the stated research problem. The next section sets out the specifics of the interpretive research framework that underpins this thesis.

3.4.1 Social and institutional reality

This thesis takes its lead from constructivist thinking to focus on the significance of semantics in the financial reporting community. Specifically, concepts and assertions that are rhetorically invoked upon the emergence of new technologies, such as XBRL, are interpreted in order to conclude on whether the meanings of those concepts are actually shared within the financial reporting community. Conclusions regarding the

meanings of concepts and the truth of assertions are by reference to Putnam's (1981) coherence theory of truth.

Alexander and Archer (2003) discuss what they refer to as the ontological and epistemic '*problems*' in accounting. They query the sense in which the objects of accounting are real and how truth in financial reporting is to be defined respectively. The discussion of accounting ontology introduces the idea of a social as well as a physical reality (Searle, 1995; Mattessich, 1995). Social reality, according to Mattessich (1995), builds upon physical and biological states but, additionally, has moral, economic, legal or similar properties that are unique to the social level. A balance sheet debt or equity claim is, for example, as 'real' in social reality as a rock is in physical reality. The reason why accounting concepts such as the balance sheet claim can be real is because of collective agreement within the accounting community that such a sign is significant and has meaning. In other words, the reality of a balance sheet claim does not necessarily require an existence that is independent of the accounting community. This consideration of accounting ontology led Alexander and Archer (2003) to suggest that an external realist position on the economic reality that accounting seeks to represent '*is not tenable*'.

Like Mattessich (1995), Searle (1995) argues that reality consists of both physical and social reality. Searle (1995) however, goes further to give particular attention to a subset of social reality that may be characterised as institutional reality. Money is a good example of Searle's (1995) institutional reality (Mouck, 2004). A piece of paper can function as money only because of the assignment of a special status that is collectively recognised. In other words, the intrinsic physical features of a piece of

paper are insufficient, in and of themselves, to allow a piece of paper to function as money. In contrast, the intrinsic physical features of a block of wood are sufficient for that block of wood to serve as a stool. Institutional reality, as presented by Searle (1995) resonates strongly with the idea of internal realism proposed by Putnam (1981) and applied by Alexander and Archer (2003).

Searle (1995) maintains that one or more of three elements are necessary to account for institutional reality: (i) collective intentionality, (ii) constitutive rules and (iii) assignment of status function. Consider a game of basketball. It requires collective intentionality on the part of the players in order for the game to be played. The rules are constitutive because they constitute the meaning of a game of basketball. Furthermore, each action within the game has an agreed status based on constitutive rules that have been collectively agreed. In short, collective intentionality and recognition of status functions result in institutional facts, which have their bases in ontological subjectivity.

Alexander and Archer's (2003) other issue with financial reporting is the epistemic problem, specifically the problem of how truth in financial reporting is to be defined. In general, epistemic assumptions determine what counts as acceptable truth by specifying the criteria and processes for assessing truth claims (Chua, 1986). In the context of this thesis, the question therefore becomes one of how the truth of a potential institutional fact is to be defined and determined. Searle's (1995) theory of institutional reality is again utilised for this purpose.

In addition to distinguishing between ontological objectivity and subjectivity, Searle's (1995) theory of institutional reality distinguishes between objectivity and subjectivity at the epistemic level (Mouck, 2004). *'Epistemically speaking, objective and subjective*

are primarily predicates of judgements' (Searle 1995, p.8), meaning that whereas the truth or falsity of an epistemically objective statement does not depend on a person's attitudes or feelings, the truth of an epistemically subjective statement fundamentally depends on attitude, opinion or feeling. *'The score at the end of the basketball game was 110-105'* is an example of an epistemically objective statement because its truth or falsity does not depend on attitude or feelings. In contrast, *'That was a really great game of basketball'* is epistemically subjective because whether it is true or not depends on an individual's attitude as to what constitutes a *'really great'* game of basketball.

A similar consideration of appropriate modes of truth, in the specific context of financial reporting, is included in Alexander and Archer (2003). A 'correspondence theory of truth', whereby there is *'correspondence or agreement between a measure or description and the phenomenon that it purports to represent'* (FASB, 1980), is presented as intuitively appealing but problematic on the basis that a normal common sense interpretation implies ontological objectivity, which is rejected by Alexander and Archer (2003). Instead, a 'coherence theory of truth', based on Putnam (1981, p.50), proposes that *'truth...is some sort of ideal coherence of our beliefs with each other and with our experiences as those experiences are themselves represented in our belief system, and not correspondence with mind-independent or discourse-independent "states of affairs"'*. Thus, the truth of a matter, according to this theory, may be defined based on coherent shared beliefs within a community rather than because of a correspondence with an ontologically objective state of affairs.

The correspondence and coherence theories of truth are analogous to epistemic objectivity and subjectivity respectively. It is not suggested, however, that ontological

subjectivity necessarily implies epistemic subjectivity. Searle (1995, p.13) confirms '*this ontological subjectivity does not prevent [truth] claims...from being epistemically objective*'. Using another basketball example, based on Searle's (1995) institutional reality, the statement '*That was a game of basketball*' is ontologically subjective and epistemically objective. Its subjective ontological basis is the collectively agreed significance of the social activities that constitute a basketball game. Because of the agreed significance of the activities that generally constitute a basketball game, an instance of such a game is epistemically objective because its occurrence is not a matter of attitude or feelings. This may be contrasted with the '*That was a really great game of basketball*' which remains epistemically subjective because, in the absence of coherent shared beliefs as to what would constitute a '*really great game*', the truth of the statement is a matter of individual attitudes. On this basis, the difference between epistemic objectivity and subjectivity depends on the richness of the social reality. As the collective recognition of status functions within a given society develops over time in terms of both quantity and quality, what counts as the truth becomes increasingly objective.

These philosophical perspectives on truth and reality, based on language, are comparable with the philosophy of Richard Rorty (1989), who was another to have promoted the 'linguistic turn' in the social sciences (Mouck, 1994). Rorty's (1989) constructivism perceives society as the product of culture, and culture the product of linguistic evolution. From Rorty's (1989) perspective, people are born into a social environment that is already linguistically carved up. Perceptions of truth and reality are therefore guided by a pre-existing socially constructed reality based on language and vocabulary. However, pre-existing linguistic classifications are not fixed, so

vocabularies can evolve in order to achieve particular objectives. Rorty refers to the evolution, and possible revolution, of vocabularies within a socially constructed reality as '*metaphoric re-descriptions*' of that reality. Metaphoric re-descriptions are regarded as new ways of describing reality, some of which catch on and some of which do not. The contingent evolution of society is therefore determined by the metaphoric re-descriptions of reality that are accepted (Mouck, 2004).

The primary similarity between Searle (1995) and Rorty (1989) is that both regard language and linguistic interaction as the basis of socially constructed realities. Rorty particularly emphasises the contingent nature of language and hence the contingent nature of the society and people it purports to describe. In Searle's (1995) terms, Rorty's (1989) pre-existing socially constructed reality may be described as an institutional reality that is subject to change. The mechanics of change in institutional realities are metaphoric re-descriptions, the acceptance and collective recognition of which may be equated to new institutional facts. As Mouck (2004) asserts, '*Language has a unique ability to generate new status functions, new institutional facts*'. Moreover, '*In certain circumstances...utterances literally constitute the institutional facts they declare. Indeed, such institutional facts are the basis for huge portions of our social reality*'.

Based on Searle (1995) and Rorty (1989) generally, and Alexander and Archer (2003) specifically in the context of accounting, the technology of financial reporting may be interpreted as a socially constructed institutional reality that is subject to metaphoric re-descriptions. Thus, metaphoric re-descriptions that catch on become new institutional facts. In the context of this thesis, assertions of the democratisation of financial

reporting because of XBRL are proposed as potentially new institutional facts on the basis that there may be collective recognition of the status of financial reporting as being democratised because of the emergence of XBRL technologies. An interpretive research framework based on the philosophies of Searle (1995) and Rorty (1989) facilitates the dynamic nature of concepts such as democratisation, accountability, financial reporting and XBRL and enables them to be re-described and understood as components of new institutional realities.

3.4.2 Sociology of scientific knowledge and Habermasian critical theory

Searle (1995) and Rorty (1989) aside, other research frameworks considered for this thesis include sociology of scientific knowledge (SSK) and Habermasian critical theory.

SSK treats all knowledge claims as socially constructed (Pinch & Bijker, 1987). In the social construction of technology, the developmental process of a technology is described as selections from a number of alternatives. A multi-directional view is essential to a social constructivist view of technology. Although, with hindsight, it is possible to collapse the multidirectional model to a simple deterministic model, SSK specifically considers that the actual stages in the development of a technology were not the only possible ones.

Pinch and Bijker (1987) argue that this model does more than merely describe development. Firstly, it highlights the multi-directional character of technological development and brings out its '*interpretive flexibility*'. Secondly, it draws attention to the role that different closure mechanisms may play in the stabilisation of technologies. Technological closure involves the stabilisation of a technology and the disappearance

of problems. To attain technological closure, it is not necessary to solve the problem in the common sense of the word, only to get the relevant social groups to see the problem as being solved.

The key social groups are those who have an input to the development of the technology in question. Members of a group, though not necessarily all groups, share the same set of meanings attached to a technology. This is where power and economic strength can enter the equation. Issues that each group may have in relation to the technology are identified, as are several variants of the solutions. Over time, growing and diminishing degrees of technological stabilisation follow.

SSK is similar to institutional reality in terms of facilitating the co-existing but competing truths that may be held by different groups in relation to a technology. The interpretive flexibility of technological development with an SSK framework is similar to metaphoric re-descriptions of social and institutional reality. Furthermore, technological closure resonates with progression over time from epistemic subjectivity to epistemic objectivity.

Habermasian critical theorists similarly reject the positivist goal of constructing an objective, empirical and systematic foundation of knowledge based on a reality of immediate sensations (Held 1980, p.164). They claim that this belies the dependent and derivative status of reality because the world of objects is the world of human interpretations.

Habermas' general concerns are with (i) the domination of the technical over the social, and (ii) how systems of advanced capitalism tend to become merely technocratic. At

the centre of 'technocratic' domination is, according to Habermas, the erosion of a societal framework. The growth of technological control implies a society in which technology becomes autonomous and dictates a value system, namely its own, to the societal domains it has usurped (Held 1980, p.265). Laughlin (1987), in advocating the application of critical theory in accounting research, argues that *'the need for an exposure of both [technical and social] and of their interrelationships has considerable relevance to accounting'*.

As Laughlin (1987) states: *'Habermas would quite understand why it is that some accounting theorists only see accounting as a set of techniques for constructing profit and loss accounts, balance sheets etc, and their desire to encourage the use of these technical developments in all organisations to improve efficiency. This, to Habermas, is an expected and understandable outcome where the technical is overriding and divorced from the social'*.

Habermas argues that all speech is oriented to the idea of a genuine consensus of truth - a discursively achieved consensus – that is rarely realised (Held 1980, p.256). This normative consensus is based on his concept of an 'ideal speech situation' and is the ultimate criterion of the truth of a statement. Habermas' critical theory of society makes this its starting point. The anticipation of an ideal form of discourse can therefore be used as a normative standard for a critique of 'distorted' communication. Habermas contends that every situation in which a consensus is established under coercion or under other similar types of condition is likely to be an instance of systematically distorted communication. This is a contemporary form of ideology. The process of

‘emancipation’ from ideology entails the transcendence of distorted communication, which in turn, requires engaging in critical reflection.

Consistent with social reality, institutional reality and SSK, the focus of Habermasian critical theory is on language, meaning and consensus. Whereas co-existing but competing truths are resolved within the Habermasian framework by means of undistorted discourse, a particular focus is on the possibility that communication may be systematically distorted. In this context, assertions that ‘XBRL democratises financial reporting’ may be perceived as systematic attempts to distort discussions about the relationship between XBRL and financial reporting.

3.4.3 Conclusions on an interpretive research framework

An interpretive research approach attempts to look into the ‘black box’ of new technological developments (XBRL) in order to understand how it potentially re-conceptualises the technology under investigation (democratisation of financial reporting). It does not take for granted definitive or literal depictions of the character of a technology in terms of what it can or cannot do. The idea of a new technology as a ‘black box’ type hard deterministic tool is rejected in favour of socio-cultural and soft deterministic perspectives. An interpretive research approach also highlights the possibility of alternative explanations of phenomena. Where meanings are contestable, they may be resolved within an organised framework to arrive at a consensus or closure. It therefore becomes possible to explore alternative meanings of technologies and their significance to different social groups at different points in time.

On this basis, assertions regarding new financial reporting technologies, such as XBRL, can be challenged and, at the emergent stage of development, are most effectively challenged within an interpretive research framework. To accept the rhetoric of democracy and technological determinism is to effectively constitute the truth of a matter based on implicit acceptance of technological determinism and assumed universally shared belief as to the meaning of democracy (in a financial reporting context). It is argued in Chapter Two that, if new technologies are to be truly equitable and effective in terms of potentially enhancing accountability, then the social implications they may carry with them should be understood, specifically because of the contingent interpretations of concepts such as ‘financial reporting’, ‘XBRL’ and ‘democracy’.

The research framework within which this thesis is undertaken is Searle’s (1995) institutional reality. It is posited that the democratisation of financial reporting because of the emergence of XBRL is, potentially, a new institutional fact. A new institutional fact requires the collective recognition of the assignment of a new status. Thus, financial reporting is potentially democratised because of XBRL if there is recognition, acceptance and acknowledgement of that status. The matter is complicated, however, by contestable meanings ‘financial reporting’, ‘XBRL’ and ‘democratisation’. It is therefore necessary to interpret the meanings of these concepts held by social groups in order to conclude whether there are universally shared understandings of the concepts that comprise the potentially new institutional fact. In other words, there should be evidence that each of ‘financial reporting’, ‘XBRL’ and ‘democratisation’ are epistemically objective concepts. The mechanism used to conclude on whether, and the

extent to which, the meanings of these concepts are epistemically objective is Osgood, et al.,'s (1957) semantic differential.

3.5 Research methods

Whereas a methodology sets out the philosophical orientation of a research project, research methods detail the ways in which data are collected and analysed. Commonly employed research methods include experiments, archival research, surveys, interviews, action research, field research, case studies and ethnographic methods (Smith 2003, p.20; Saunders, et al., 2000, p.92).

Experiments, surveys and archival research are frequently utilised in positivist-oriented research on the basis that these methods fit the hypothetical propositions and suit the examination of causal relations and quantitative analyses of well-established variables. Action research, field research and ethnographic methods are commonly employed for interpretive and phenomenological type research projects that are characterised by complex constructs, emergent variables and qualitative analysis of dynamic phenomena. However, while a research method may appear to have a natural fit with a particular research paradigm, it remains possible and reasonable to consider experiments, surveys and archival research in the context of interpretive and phenomenological research. Similarly, there is no reason why action research, field research and ethnographic methods could not be considered for research projects with a positivist orientation. The choice of methods ultimately depends on the specifics of the research objectives, the methodological framework within which the research is undertaken and the practical limitations within which the researcher operates.

For the purpose of this thesis, experiment and archival research are regarded as ill suited to a research question about a technology that is at the emergent stage of development. In this thesis, the democratisation of financial reporting because of XBRL is posited as a new institutional fact. Its confirmation as such requires collective recognition. In order to assert or reject collective recognition, the opinions of a sufficiently large number of people must be obtained. The research method therefore needs to facilitate the collection of data for a sufficient number of cases. For this reason, action research, case studies and field research methods were concluded not to be the most suitable research methods. While they are acknowledged to be methods that could be employed to gain valuable insights to relationships between XBRL and financial reporting at a micro level (and which fit the current maturity of XBRL technologies), these methods, by their nature, focus on small numbers of cases only. Regarding interviews, it is concluded that XBRL interview research could be more usefully undertaken using the outcomes of this thesis as the starting point. The outcomes of this thesis may provide a useful basis for more in-depth discussion with interviewees.

A survey is a research method in which an investigator asks questions of respondents. It is one of the most widely used methods of research (Dorsten & Hotchkiss 2005, p.174; Beins 2004, p.201; Saunders, et al., 2000, p.93). Surveys facilitate the collection of large volumes of data in a standardised and economical way, which fit the requirements of this thesis. However, because there is usually a limit to the time and effort a respondent is willing to spend responding to a survey request, the data collected is less likely to be as rich, in terms of interpretive potential, as data collected in the course of action research, case studies or field research. Consequently, there is a trade-off between the quantity of data collected and its analytical richness.

A questionnaire survey is concluded to be the method that is most suitable for achieving the specific research objectives of this thesis. The purpose of utilising the survey method is to collect data regarding (i) beliefs as to whether XBRL democratises financial reporting and (ii) respondent interpretations of the concepts of 'financial reporting', 'XBRL' and 'democratisation'. Because of the global nature of XBRL, individuals in numerous geographic jurisdictions may have differing opinions as to whether it democratises financial reporting. Furthermore, they may interpret the concepts of 'financial reporting', 'XBRL' and 'democratisation' in different ways. An online survey is regarded as the most practical way in which to gather relevant data from a sufficient number of geographically dispersed individuals.

There are a number of ways in which a survey research instrument may be designed (Saunders, et al., 2000, p.288; Oppenheim, 1992). A survey can take the form of open or closed questions, checklists, rankings or scales and can depend on whether substantive responses from survey participants are opinions, judgements or knowledge. The survey may also capture the personal characteristics of individual respondents.

Scales are often used to collect attitude, opinion and belief data. Whereas methods of scale construction include Likert, semantic differential, Thurstone, Q-sort, rank-order, Guttman and Rasch (Dawis, 1987), the scale that is most commonly used is the Likert scale (Beins 2004, p.18; Saunders, et al., 2000, p.295). Survey participants are typically requested to indicate on four-, five- or seven-point Likert scales how strongly they agree or disagree with one or more statements. For the purpose of this thesis, a Likert scale is employed to determine the extent to which respondents agree or disagree with the assertion that XBRL democratises financial reporting.

Semantic differential scales are commonly used to capture interpretations of concepts or underlying attitudes (Smith 2003, p.58; Saunders, et al., 2000, p.296). A significant difference between Likert and semantic differential scale instruments is that whereas the Likert uses only one rating dimension for all scales in an instrument, the semantic differential incorporates several dimensions for rating the same item or concept (Dawis, 1987). A Likert instrument therefore generates a single score as a measure of an item but a semantic differential instrument generates several scores, each relating to different dimensions of the item or concept being measured. The distinction is significant because, in attitude research, *'a single score measured in attitude research does not reflect the three different components of the traditional attitude definition: affective, cognitive and conative. Accordingly, the interpretation of attitude results should not make specific conclusions about evaluations, beliefs or action tendencies without breaking down the single attitude scores into its component parts'* (Grove & Savich, 1979). Furthermore, whereas a Likert scale rating typically measures the extent to which a respondent agrees with something, there is greater flexibility with a semantic differential scale in terms of the labels that may be attributed to scales (Chin, et al., 2008). Although survey respondents may be less familiar with a semantic differential than a Likert scale and cognitive demands may increase as a consequence, it is concluded that the semantic differential is the most appropriate survey instrument to employ for purpose of interpreting the 'financial reporting', XBRL' and 'democratisation' concepts.

3.6 The semantic differential as a quantifiable measure of meaning

A semantic differential survey instrument provides an objective mechanism to locate the connotative interpretation of concepts in semantic space. A respondent is provided with one or more concepts to be interpreted and sets of bi-polar adjectival interval scales by which to express the interpretation. Ideally, the scales should be representative of the ways in which interpretations may vary in, potentially, multi-dimensional semantic space, yet be sufficiently concise for practical use. Interpretations are provided by the respondent by means of the direction and intensity of scale ratings. For example (Osgood, et al., 1957, p.26, Haried, 1972):

FATHER								
Good	X	–	–	–	–	–	–	Bad
Strong	–	–	X	–	–	–	–	Weak
Active	–	X	–	–	–	–	–	Passive
Happy	–	–	–	X	–	–	–	Sad
Soft	–	–	–	–	–	X	–	Hard
Slow	–	–	–	–	–	–	X	Fast

When a concept, such as ‘FATHER’, is interpreted by reference to a series of representative and sensitive scales, the scale ratings (indicated by ‘X’) are used to associate a respondent’s interpretation of the concept with a particular point in a multi-dimensional semantic space. The seven intervals on each scale correspond to ratings between one and seven. A rating of ‘one’ corresponds to a respondent selection at the extreme ‘negative’ end of the scale (examples being ‘bad’, ‘weak’, ‘slow’). A rating of ‘seven’ corresponds to the extreme ‘positive’ end of the scale (examples being ‘strong’,

‘active’, ‘happy’). Ratings from ‘two’ to ‘six’ correspond to the interval points between the extremes. The quality of meaning depends on the available scales and the intensity depends on the extremeness of scale positions selected by a respondent. Using this approach, interpretations become quantifiable as locations in a semantic space. Differences between interpretations of concepts become measurable as distances between localised points.

The ability to measure and compare the meanings of concepts came to prominence as a psychology research issue in the 1950s. Psychologist and communication scholar, Charles E. Osgood, together with colleagues George J. Suci and Percy H. Tannenbaum, issued the seminal publication ‘The Measurement of Meaning’ in 1957.

The psychological meaning of ‘meaning’ on which Osgood, et al., (1957, p.320) focussed was connotative meaning, which, for explanatory purposes, is usefully contrasted with denotative meaning. In basic semantics, the denotative meaning of a word is its literal abstract dictionary definition, devoid of attitude, emotion, colour or metaphorical intention (Dictionary.com, 2010e). A second level of meaning, being connotative, is the additional subjective, cultural or emotional aspect of meaning that may be associated with the word or phrase (Dictionary.com, 2010f). For example, ‘*wild or cultivated, usually prickly-stemmed, pinnate-leaved, showy-flowered shrubs of the genus Rosa*’ would constitute a denotative explanation of ‘red rose’ (Dictionary.com, 2010g). For some people, ‘red rose’ might also evoke connotations of passion and love. Whereas the denotative meaning can provide a basis for universal objective agreement as to the nature of the phenomenon under consideration, connotative perceptions reveal

emotional contextual meanings that may or may not have a universal psychological resonance.

Ideally, each bi-polar adjectival scale in a semantic differential instrument corresponds to a dimension of the semantic space in which a concept is located. Furthermore, each scale, ideally, is perfectly aligned with the dimension and is perfectly reliable. In practice, however, scales are highly unlikely to be either perfectly aligned or perfectly reliable. This is why a selection of scales is used to locate a concept. Deriving an average score from closely related scales, in terms of the dimension they represent, is *'assumed to be both more representative and more reliable than scores on individual scales'* (Osgood, et al., 1957, p.78). Average scale ratings on each dimension are commonly referred to as 'factor scores'. Factor scores are calculated by identifying and clustering closely related scales using a statistical technique called 'factor analysis' (Kim & Mueller, 1978).

It could be inferred from the brief explanations in the literature of how scales are selected for semantic differential instruments that there is a standard set of scales to be used in all circumstances. However, Osgood, et al., (1957, p.76) clearly points out that the semantic differential instrument is *"a very general way of getting at a certain type of information, a highly generalisable technique of measurement which must be adapted to the requirements of each research problem to which it is applied. There are no standard concepts and no standard scales; rather the concepts and scales used in a particular study depend upon the purposes of the research. Standardisation, and hence comparability, lies in the allocation of concepts to a common semantic space defined by a common set of general factors, despite variability in the particular concepts and*

scales employed". Consequently, the development of a relevant, reliable and valid semantic differential instrument is a challenging part of the research process.

The following sections set out the research issues related to the development of a semantic differential instrument and how factor analysis techniques are employed to assist in interpreting the scale ratings.

3.6.1 Development of a semantic differential instrument

A variety of approaches to scale selection is evident in semantic differential literature. Oliver (1974), for example, merely uses a subset of ten of the scales that were used originally by Osgood, et al., (1957) and argues that they are appropriate on the basis that they possessed high factor loadings in Osgood, et al.,'s (1957) studies and were stable across concepts. Oliver's (1974) approach is open to criticism on grounds of validity given that Osgood, et al., (1957) asserted that the scales should be adapted to the particulars of each research problem. Nonetheless, this approach of selecting a subset of Osgood, et al.,'s (1957) original list of scales is common in literature but is based on a contestable assumption that the reliability and validity of the scales used by Osgood, et al., (1957) can be automatically extended to other research domains.

An approach to scale selection that is evident in psychology literature (Triandis, 1960), and which is used by Haried (1972) for accounting purposes, is the 'triad procedure'. A number of relevant test subjects are presented with sets of three concepts from the domain of interest and requested to identify (i) which one of the three is different to the other two and (ii) why it is different. The adjectives elicited by the subjects to describe why one concept is different and their logical opposites form the scales that are used for

subsequent research of a particular domain of meaning. Scales developed in this way are argued to be specifically relevant to the domain of interest but this does not automatically mean that they are necessarily more reliable or valid than scales selected in other ways. Baumgardner and Bowe (2002), utilise a more straightforward ‘brainstorming’ approach for the purpose of identifying scales that may be relevant to the particular research domain. Brainstorming may take place among the researchers themselves and/or among groups of relevant individuals and makes no particular reference to the scales originally used by Osgood, et al., (1957). The brainstorming approach may be most effective in research circumstances in which trial and error can be accommodated.

Whether Osgood, et al.,’s (1957) original scales, using a triad procedure, brainstorming, or some other methods of scale construction, there can be no single best method that works perfectly in all research circumstances. As Dawis (1987) notes, *‘purpose, context, and limitations on the researcher have to be taken into account...a hybrid approach, tailored to the situation, might be better than any of the standard approaches’*. By necessity, survey instruments should be continually tested for relevance, reliability and validity in new research settings.

Given that there is no single definitive approach to the selection of relevant semantic differential scales, it is helpful to refer to the criteria that should be used to determine scale selection (Al-Hindawe, 1996; Malhotra, 1981; Maguire, 1973; Heise, 1969; Osgood, et al., 1957, p.78):

- (i) Scales should be representative of the dimensions (or factors) of meaning that are likely to exist in the conceptual semantic space. The definition of a semantic

space by subjects is wholly dependent upon the scales that are made available to them. In other words, an underlying factor can appear in subsequent analysis only if it is represented by one or more scales in the measurement instrument. Ideally, each scale would be perfectly aligned with one factor and not at all aligned with any other factors that may exist in the semantic space. Individual scales are, in reality, unlikely to be perfectly aligned with a single factor, which is why each factor is taken to be represented by a number of closely aligned scales.

- (ii) Scales should be relevant to the concepts that are subject to connotative interpretation. The inclusion of irrelevant scales is more likely to yield neutral responses but could possibly contaminate the quality of the data and subvert the analysis. On the other hand, if subtlety is a necessary part of the data collection process, the deliberate inclusion of scales that are relevant only via metaphor to subjects may be justifiably included.
- (iii) The scales should consist of bi-polar adjectives. It is important that the scales are affective antonyms or function as affective antonyms in the context of a particular study. If this is not the case, the interpretation of the data may be open to question. For example, 'fair' and 'cruel' are not necessarily polar opposites because some concepts could be considered both fair and cruel. There is, furthermore, the consideration of complementary and gradable antonyms. Complementary scale antonyms are pairs that express absolute opposites, an example being 'mortal' and 'immortal'. Gradable scale antonyms are opposite ends of a scale but can have variations depending on the context in which the antonyms are expressed. For example, 'tall' and 'short' may be the appropriate

antonyms when describing subject heights whereas ‘long’ and ‘short’ is more appropriate for describing distance. Gradable antonyms can be more subtle than complementary antonyms and, for this reason, can be more useful for interpretation purposes on the basis that the specific context and objectives of the study can be reflected in both ends of scales. A semantic differential that combines scales that use complementary and gradable antonyms is also feasible. Another possibility for scale construction is the use of negated adjectives, an example being ‘complex’ and ‘not complex’. The advantage of this approach is certainty regarding the adjective but, while it may establish what something is not, it does not necessarily establish what it is.

To summarise, the objective of a semantic differential instrument is to identify true variances in the affective responses of survey participants to concepts based on scale judgements. If the scales are not sufficiently relevant to the participants or relevant to the domain of study in terms of what constitutes bi-polarity, they may be misunderstood by participants. Consequently, measured variance may not be the true variance¹⁸. It is for this reason that ad hoc scale selection and unthinking recycling of scales from other studies are open to criticism on grounds of one or more of relevance, reliability or validity (Al-Hindawe, 1996). Scales that are useful in one subject domain do not necessarily transfer to other domains because, in a different situational context, they may be irrelevant, may not be bi-polar or may be misunderstood by respondents.

¹⁸This is an example of ‘measurement error’ (Beins 2004, p.106).

3.6.2 Factor analysis and its application to the semantic differential

‘Factor analysis refers to a variety of statistical techniques whose common objective is to represent a set of variables in terms of a smaller number of hypothetical variables’ (Kim & Mueller 1978, p.9). Factor analysis explores relationships among measured variables (such as bi-polar adjectival scales) in order to determine whether the relationships can be summarised as a smaller number of latent constructs (for example the dimensions of connotative meaning). The latent constructs are logically and statistically inferred rather than directly observed.

Factor analysis is based on two fundamental postulates (Kim & Mueller 1978, p.43). The first is the postulate of factorial causation – factor analysis alone does not prove a causal relationship between the measured and latent variables but the postulate allows a researcher to assert that, at a minimum, the measured variables are not inconsistent with a factorial model. The second assumption is the postulate of parsimony – for example, given that both a one-factor model and a two-factor model are consistent with the measured variables, the one-factor model is preferred because it is the more parsimonious model.

Accepting these postulates, a researcher derives a matrix of covariances based on measured variables obtained from a sample. From there, the initial latent constructs are inferred – this is commonly referred to as initial ‘factor extraction’ (Thompson 2004, p.36; Kim & Mueller 1978, p.48). The outcome of the initial factor extraction procedure is usually the minimum number of factors that can adequately account for the observed covariances. The final step is to undertake ‘factor rotation’, the purpose of which is to attempt to further simplify the factor structure for interpretation purposes.

Rotation makes no difference to the amount of covariation explained by the initial factor extraction and therefore no difference to the goodness of fit between the data and the factor structure, but it can facilitate interpretations of the factor structure. The final factor structure constitutes the reduced set of latent variables that may be used for further interpretation and analysis.

Factor analysis statistical techniques are available as part of the standard functionality of statistical software. Two examples reviewed by the researcher were SPSS¹⁹ (SPSS, 2010) and XLSTAT (Addinsoft, 2010). SPSS is an IBM software application that is commonly used for statistical and predictive analysis. XLSTAT is an MS Excel add-in application and is described on its website as *'the leading data analysis and statistical solution for Microsoft Excel'*. Due to the researcher's familiarity with MS Excel, XLSTAT is the preferred choice of software for factor analysis. To ensure the accuracy of statistical test results produced by XLSTAT and its equivalence with SPSS, a number of identical tests were run on both applications. There were no differences between the results produced. It is concluded that XLSTAT was reliable and accurate for the required purpose.

The semantic differential makes use of factor analysis to (i) reduce measured variables (scale ratings) to parsimonious sets of underlying latent variables, and (ii) to calculate what are called 'factor scores' for each respondent who submits a set of scale ratings. The ratings on the individual adjectival scales provide the basis of a covariance matrix from which a multi-dimensional factor structure is extracted and labelled. This structure is the interpretive framework within which each respondent expresses an

¹⁹Statistical Package for Social Sciences

interpretation of the concept in question. The interpretation is measured by reference to the respondent's factor scores. Thus, the complexity of attitude or emotion that respondents attach to concepts may be elicited, measured and interpreted in a meaningful way. Comparisons between respondents are also possible using appropriate statistical analysis of the factor scores.

3.6.2.1 Generation of an interpretive framework using factor analysis

An illustrative example of the interpretive framework produced by XLSTAT is presented in Table 1. It is based on pilot testing of a semantic differential instrument for the purpose of interpreting ‘financial reporting’²⁰.

Table 1: Six-factor interpretation of the ‘financial reporting’ concept

Correlations between scales and factors:	F1	F2	F3	F4	F5	F6	h²
honest-dishonest	0.836	0.102	0.020	0.015	0.040	-0.046	0.714
reliable-unreliable	0.825	0.173	0.085	0.142	-0.076	-0.042	0.745
reputable-disreputable	0.680	0.022	0.158	0.444	0.016	0.036	0.686
adequate-inadequate	0.655	0.242	0.218	0.079	0.145	-0.021	0.562
healthy-sick	0.623	0.239	0.185	0.333	0.172	0.230	0.673
transparent-opaque	0.620	0.258	0.046	0.176	0.145	0.492	0.746
valuable-worthless	0.119	0.844	0.087	0.061	-0.026	0.118	0.753
informative-uninformative	0.199	0.730	0.197	0.078	-0.092	0.075	0.632
powerful-weak	0.078	0.697	0.051	-0.047	-0.011	0.359	0.626
beneficial-adverse	0.204	0.639	0.434	0.244	-0.159	-0.012	0.723
relevant-irrelevant	0.252	0.532	0.376	-0.081	0.377	-0.020	0.637
strong-weak	0.450	0.509	0.264	0.082	0.265	0.048	0.611
influential-not influential	0.025	0.413	0.722	0.104	0.179	0.054	0.738
good-bad	0.304	0.204	0.684	0.258	0.119	0.223	0.733
dynamic-static	0.422	0.116	0.565	-0.362	-0.123	0.285	0.737
active-passive	0.487	0.330	0.522	-0.190	0.076	0.294	0.747
objective-subjective	0.176	-0.042	0.003	0.710	0.348	0.035	0.659
accountable-unaccountable	0.293	0.176	0.080	0.656	-0.099	0.016	0.563
easy-difficult	-0.002	-0.117	0.325	0.124	0.794	0.047	0.767
simple-complex	0.060	-0.055	-0.156	-0.048	0.656	0.502	0.715
certain-uncertain	0.279	0.442	-0.086	0.304	0.564	-0.090	0.698
democratic-undemocratic	-0.001	0.167	0.097	0.449	0.140	0.741	0.807
flexible-inflexible	-0.024	0.134	0.272	-0.184	0.005	0.671	0.577
timely-untimely	0.422	0.468	0.317	-0.356	0.074	0.104	0.640
convergent-divergent	0.441	0.498	0.196	0.041	0.300	-0.077	0.578
Eigenvalues	4.489	3.998	2.511	2.103	2.018	1.951	
Variability explained (%)	17.955	15.991	10.043	8.412	8.071	7.805	
Cumulative variability (%)	17.955	33.946	43.990	52.402	60.473	68.277	

²⁰Full details of the pilot testing are set out in section 4.5 of Chapter Four.

The semantic differential scales (measured variables) are listed down the left side of Table 1 and the underlying latent factors (F1 to F6) are presented across the top. The values included in columns F1 to F6 in the top section of the table are the covariances between scales and factors. Covariances in excess of 0.5 (indicating the scales that correlate most significantly with the factor) are highlighted. The information provided in Table 1 statistically supports an assertion that 25 measured variables can be reduced to six latent factors whilst retaining 68.277% of the variability in scale ratings. Each factor may be perceived as a dimension of the meaning of ‘financial reporting’. As such, interpretations of ‘financial reporting’ may be located within this six-dimensional interpretive framework.

The discriminatory capability of each factor is presented in the bottom section of Table 1. Eigenvalues are calculated by summing the squares of the columnar covariances. Each measures the variability in the interpretation of the concept that is captured by each factor. The variability in interpretation may be equally expressed as a percentage by dividing the eigenvalue by the number of scales. For example, the F1 factor captures 17.955%²¹ of the variance in survey responses. Accordingly, this factor may be regarded as significant in terms of discriminating between interpretations of ‘financial reporting’ because respondents who hold different interpretations of ‘financial reporting’ are more likely to differ in terms of this particular factor. It also follows that the scales that correlate most strongly with F1 are the most significant adjectives in terms of capturing interpretations of ‘financial reporting’. For example, differences in

²¹Eigenvalue of 4.489 divided by 25 scales equals 0.17955.

interpretations of ‘financial reporting’ are more likely to be attributable to perceptions of honesty or reliability rather than, say, its timeliness or state of convergence.

Factors F2 to F6 follow the same logic in terms of the scales that describe the underlying factors and the discriminatory significance of the factors in terms of interpretations of the ‘financial reporting’ concept. The decreasing percentages of variance explained by factors F2 to F6 indicate that the first three factors provide a disproportionately large explanation of the response variations in comparison to the remaining factors. This is consistent with semantic differential theory (Osgood, et al., 1957, p.73).

Factors F1 to F6 in Table 1 cumulatively account for 68.277% of variation in the scale ratings. The additional factors that explain the remainder of the variation are excluded on the basis that the marginal increase in variation explained by any additional individual factors is not significant. For example, F7 would only account for an additional 3.8% of variation. The threshold for including or excluding factors is usually with reference to the eigenvalue scores. The cut-off point is usually to consider factors for which eigenvalues are greater than one (Kim & Mueller 1978, p.49). This approach is adopted in this thesis.

In addition to highlighting scales that positively cluster together on a given factor, scales that negatively correlate with each other can also be informative. For example, both the ‘*easy-difficult*’, and ‘*simple-complex*’ scales correlate positively with the F5 factor in Table 1 but both of these scales correlate negatively with the F2 factor. Accordingly, it is possible to interpret factors, not only in terms of the scales that correlate positively but also in terms of the scales that correlate negatively (and thereby

indicate what the factor is not). In this example, the F5 factor is interpreted in terms of what it is by reference to the *'easy-difficult'* and *'simple-complex'* scales and F2 is interpreted in terms of what it is not by reference to the same scales. It may be inferred that respondents interpret the concept of 'financial reporting' to be 'valuable' and 'informative', which is the primary basis of the F2 factor, but also as 'difficult' and 'complex'. Therefore, although interpretation and labelling of F2 would typically be based on the 'valuable' and 'informative' attributes, it would be important not to describe F2 in terms of being 'easy' or 'simple'. Additionally, other scales that correlate quite strongly with a given factor (for example greater than 0.3 but less than 0.5), although more limited in terms of discriminatory capability, can still be somewhat influential in terms of factor interpretation and labelling.

The right-most column of Table 1 presents the communality coefficient (h^2) for each scale. A communality coefficient is calculated by summing the squares of each row's covariances. Each h^2 captures the amount of variance in individual scale responses that is captured by a six-factor interpretive framework. For example, the six-factor structure captures 71.4% of the variation in responses to the *'honest-dishonest'* scale. A high communality coefficient indicates that a significant amount of variation in responses is captured by the interpretive framework. A low communality coefficient indicates that a scale may not be particularly relevant to the interpretation of a concept. For example, based on a 56.2% h^2 value, respondents do not appear to have interpreted 'financial reporting' in terms of it being adequate or inadequate. In other words, adequacy does not appear to be a discriminatory adjective.

3.6.2.2 Derivation of factor scores using factor analysis

The interpretive framework for a concept such as ‘financial reporting’ is one of two significant outputs produced by the XLSTAT factor analysis procedure. The second output is a set of factor scores for each survey respondent. Factor scores locate each respondent’s interpretation of the concept within the interpretive framework. Table 2 sets out an example of how factor scores for an individual respondent are calculated within a three-factor interpretive framework.

Table 2: Illustrative example of derived factor scores for one survey respondent within a three-factor interpretive framework

	Factor pattern coefficients			Measured variables for one survey respondent	Product of factor pattern coefficients and measured variable		
	F1	F2	F3		F1	F2	F3
easy – difficult	0.027	0.422	0.133	0.687	0.018	0.290	0.091
adequate-inadequate	0.230	0.118	(0.084)	(1.860)	(0.428)	(0.220)	0.157
informative-uninformative	0.134	0.016	0.030	(1.653)	(0.221)	(0.027)	(0.050)
reliable-unreliable	0.237	0.114	(0.106)	(1.285)	(0.304)	(0.147)	0.136
healthy-unhealthy	0.155	(0.001)	0.031	(1.962)	(0.305)	0.001	(0.061)
honest-dishonest	0.236	(0.011)	(0.148)	0.003	0.001	(0.000)	(0.000)
valuable-worthless	0.066	(0.195)	0.119	0.104	0.007	(0.020)	0.012
flexible-inflexible	(0.172)	0.033	0.523	0.881	(0.151)	0.029	0.461
powerful-impotent	0.069	(0.178)	0.108	(2.381)	(0.164)	0.423	(0.257)
reputable-disreputable	0.234	0.034	(0.126)	(1.425)	(0.334)	(0.048)	0.179
beneficial-pointless	0.118	(0.141)	0.035	0.254	0.030	(0.036)	0.009
influential-not influential	0.003	(0.233)	0.154	(1.315)	(0.003)	0.306	(0.202)
dynamic-static	(0.077)	0.075	0.445	0.995	(0.076)	0.074	0.443
democratic-undemocratic	0.051	0.037	0.179	0.474	0.024	0.018	0.085
simple-complex	0.070	0.467	0.030	0.697	0.049	0.326	0.021
				factor scores (sum of each column)	(1.858)	0.970	1.024

The factor pattern coefficients are generated automatically by XLSTAT as part of the factor analysis process. The factor pattern coefficients are the equivalent of the beta regression coefficients in regression analysis that are applied to the independent measured variables in order to calculate the values for the dependent variables. In this

case, the measured variables are the normalised responses of one individual to each scale²². The products of factor pattern coefficients and the measured variables are listed on the right side of Table 2. The columnar sum of the products generates a three-factor score for the respondent (the dependent variables). Thus, an interpretation of ‘financial reporting’ by an individual respondent may be expressed in terms of location coordinates within a multi-dimensional interpretive framework. On this basis, it becomes possible, by reference to factor scores, to investigate similarities and differences in interpretations of concepts.

3.7 The semantic differential in accounting and information systems research

Osgood, et al.,’s (1957) semantic differential research investigates personality measurement, psychotherapy, communications, and attitude measurement. The possibility to objectively measure attitude and meaning has made the technique attractive to researchers in many subject domains including politics, marketing, cultural studies, linguistics, social psychology, technology acceptance and religion (Chin, et al., 2008; Al-Hindawe, 1996; Malhotra, 1981). Its versatility and popularity stems from the fact that the bipolar adjective pairs can be adapted to a wide variety of subject domains (Himmelfarb 1993, p.57). Heise (1969) refers to the existence of in excess of 1,000 articles and books dealing with the semantic differential.

The semantic differential is also evident in accounting research. Haried (1972, 1973) appears to be the first published accounting research work that utilises the semantic

²²The raw responses for each scale are normalised by (i) deducting the average scale value for all 249 respondents from the scale value chosen by this individual and (ii) dividing the result by the scale response standard deviation for all respondents. The values included in the measured variables column in Table 2 are otherwise known as standard scores (Dorsten and Hotchkiss 2005, p.220).

differential technique. Haried's (1972) research investigates whether preparer and user groups shared connotative meanings of certain accounting concepts, predicated on the argument that because meaning is fundamental to communication, and accounting incorporates communication, meaning is therefore central to accounting. Haried (1973) examines the extent to which apparently synonymous accounting concepts have similar measured meanings among respondents. Haried (1972, 1973) concludes that, while the Osgood, et al., (1957) technique is sensitive and reliable, connotative meaning and the semantic differential are not particularly relevant to accounting research because the dimensional semantic space in accounting appears to be structurally different and because no significant differences between concepts or groups were found within the semantic space when differences were expected.

Houghton (1988) indicates that limited accounting research interest in the semantic differential in the 1970s may have been influenced by the outcomes of Haried's (1972, 1973) work. Oliver (1974) and Flamholtz and Cook (1978) are the only two journal publications of note in accounting at the same time that the technique was commonly in use in other disciplines. Oliver's (1974) research is coincidentally similar to Haried's in terms of investigating the semantic meaning of accounting concepts held by groups of accounting professionals involved at various stages of the production and use of accounting information but differs in terms of both method and findings. Although Oliver (1974) concludes that significant between-group differences exist, the conclusions are based on a less rigorous approach than Haried (1972) to the selection of the semantic scales.

Flamholtz and Cook (1978) investigate comparative perceptions of human resource accounting and conventional notions of accounting. They use the semantic differential technique to identify two distinct clusters of perceptions: traditional and non-traditional. They argue the existence of a 'semantic halo effect' for traditional accounting and none for comparatively new areas such as human resource accounting. Consequently, they suggest that resistance to accounting innovations may be explained by connotative interpretations.

Two distinct bodies of semantic differential accounting literature are observable: (i) the earlier 1970s work of Haried (1973, 1972), Oliver (1974), and Flamholtz and Cook (1978), and (ii) the later work of Houghton (1987, 1988), which was built upon by Bagranoff (1990), McNamara and Duncan (1992), Houghton and Hronsky (1993), Bagranoff, et al., (1994), and Houghton (1998). Houghton's work is noteworthy in that it highlights the limitations of the 1970s research and, significantly, re-works Haried's (1972) data to conclude that the structure of meaning in the accounting domain is, in fact, consistent with that originally proposed by Osgood, et al., (1957). Haried's (1972) conclusions therefore appear to be inaccurate. The absence of specific consideration of scales selection, in the case of Oliver (1974), and apparently unrotated factor analysis in the case of Flamholtz and Cook (1978), arguably limits the robustness of the early research. Nonetheless, these limitations should not detract from the more general contribution that measuring meaning using the semantic differential could be relevant to the accounting domain. Comparative meanings held by different groups of 'true and fair', auditing, internal controls and international accounting concepts are the main themes of the research undertaken in the 1980s and 1990s.

IS researchers have applied the semantic differential technique to measure concepts such as computer user satisfaction, IS satisfaction, IS planning success, information culture, computer attitudes, media perception and website performance. Both theory and empirical data support use of the semantic differential use in IS research (Verhagen & Meents, 2007).

Examples of technology innovation and acceptance research that captures attitudes towards usage and perceptions of new technologies include Chin, et al., (2008), Katz and Aakhus (2002), Bhattacharjee (2001), Davis (1993), Bailey and Pearson (1983), Dickson and Slevin (1975), and Gallagher (1974). With specific reference to semantic differential scales, Chin (2008) undertakes a study of technology acceptance using semantic differential scales for the purpose of addressing research shortcomings of Likert scales, Davis (1993) investigates attitudes towards using a new electronic mail system and a text editor, Bhattacharjee (2001) examines levels of user satisfaction with online banking, Dickson and Slevin (1975) attempt to predict when individuals will try something new, Katz and Aakhus (2002) investigate connotative perceptions of new technologies such as mobile phones, Gallagher (1974) captures user perceptions of a management information system, and Bailey and Pearson (1983) investigate computer-user satisfaction.

The technology studies of Davis (1989), Venkatesh, et al., (2003) and Chin, et al., (2008) have 'user acceptance' of new technologies as a common investigative theme. Although Davis (1989) used Likert rather than semantic differential scales as the method of data collection, the common issues of scale selection, and instrument reliability and validity are addressed by Davis (1989). Furthermore, Chin, et al., (2008)

explore using the semantic differential instead of Likert scales for the purposes of improving the efficiency and validity of TAM.

3.8 Ethical considerations

Ethics refers to the appropriateness of the behaviour of the researcher in relation to the rights of those who are affected by the research (Saunders, et al., 2000, p.130). In general, ethical codes that address the appropriateness of research behaviour typically refer to principles such as (Beins 2004, p.32; Dorsten & Hotchkiss 2005, p.339):

- Professional competence;
- Integrity;
- Professional and scientific responsibility;
- Respect for people's rights, dignity and diversity;
- Social responsibility and justice.

For individuals, the challenging practicalities of research can tempt the falsification or fabrication of data, the publication of analysis that is designed to mislead, or plagiarism (Beins 2004, p.30). However, '*honest and transparent reporting of research practice is an ethical duty of those participating in accounting research*' (Smith 2003, p.98). Everything done, how and why it was done, and the known deficiencies of what was done should be transparently reported.

Of particular relevance to this thesis from an ethical perspective is the recruitment of survey participants and ensuring that informed consent is obtained. The identification of potential survey participants is undertaken by reference to explicit and objective

criteria to ensure that participants have the requisite knowledge to participate. The detail of how survey participants are identified is set out in Chapter Four.

Potential participants are invited by email to participate in the survey. The email (which is included as Appendix 1 to this thesis) refers to:

- An invitation to take part in the survey on an anonymous and confidential basis;
- An explanation of the objectives of the research;
- A link to the online location of the survey;
- Reference to the privacy policy of the website upon which the survey was hosted;
- Pertinent information about the researcher;
- Identification of research supervisors at the University of Birmingham.

Full disclosure regarding the nature and purpose of the research is thereby deemed to be provided to potential participants for the purpose of facilitating informed consent. There is no research reason nor is there any attempt to use deception in order to obtain data. Each invitee can freely decide not to participate. Two reminder emails (which are included as Appendices 2 and 3 to this thesis) are sent at weekly intervals to encourage participation. Thereafter, it is assumed that non-respondents explicitly chose not to participate.

In the case of this thesis, there was some correspondence between the researcher and a number of potential participants regarding the nature and purpose of the semantic differential instrument. The email correspondence included a link to a lengthier non-technical explanation authored by Heise (1970).

In summary, appropriate researcher behaviour and due consideration for potential and actual survey participants are relevant to this thesis. The anonymity and confidentiality of the data are preserved at both collection and analysis stages, as were the general principles of ethical research.

3.9 Conclusions

The purpose of this chapter is to set out the methodological basis of the thesis and the choice of methods utilised to collect the data. The methodological basis is most accurately described as ‘interpretive’. The purpose of the research is to interpret and analyse meanings that are held by particular social groups and to determine whether meanings are collectively held.

An interpretive perspective provides a suitable platform upon which to base an investigation of a new technology such as XBRL. The relevant variables are still emerging and the constructs may be complex. It is argued in Chapter Two that the so-called democratisation of financial reporting has been implicitly assumed by accounting researchers primarily based on rhetoric and hard technological determinism. An interpretive perspective makes no such *a priori* assumptions regarding relationships between XBRL on financial reporting and, for this reason, fits the objectives of the thesis.

Constructivist perspectives of reality (and society in general), as espoused by Searle (1995) and Rorty (1989), are consistent with the possibilities that interpretations of ‘financial reporting’, ‘XBRL’ and ‘democratisation’ may differ across time and space. Assertions of the democratisation of financial reporting may be, in Rortian terms, a

metaphoric re-description of reality, which if it catches on, becomes, in Searle's (1995) terms, an institutional fact. However, the institutional fact of the matter requires a collective recognition of its truth. In short, it should be an epistemically objective phenomenon.

The research methods employed in this thesis combine (i) a single Likert scale to capture the extent to which survey respondents agree or disagree with a substantive assertion that 'XBRL democratises financial reporting', and (ii) sets of semantic differential scales to capture respondent interpretations of each of the 'financial reporting', 'XBRL' and 'democratisation' concepts.

The semantic differential is the method that is best suited to capturing interpretations of concepts in the manner that is required for this thesis. Each semantic differential tool provides a standard interpretive framework within which respondents express comparable interpretations. It is on this basis that the epistemic objectivity or subjectivity of each concept is determined.

Applying factor analysis techniques to the collected semantic differential data, a multi-dimensional interpretive framework is constructed for each of the 'XBRL', 'democratisation' and 'financial reporting' concepts. The responses of each survey participant are mapped to locations within the interpretive framework for the purpose of investigating the existence of statistically significant differences. Thus, not only are the substantive responses of participants to the Likert scale comparable, respondent interpretations of the constituent concepts can be also compared and contrasted. Whether the concepts included in the substantive assertion can be regarded as

epistemically objective, and thus whether the assertion that 'XBRL democratises financial reporting' is an institutional fact, is assessed on this basis.

The methods are concluded to be appropriate to the objectives of the thesis and the methodological framework within which the research is undertaken. Specifically, the requirement to demonstrate the epistemic objectivity of 'financial reporting', 'XBRL' and 'democratisation' necessitates a method that facilitates the interpretations of a sufficiently large number of test cases. A semantic differential survey instrument meets this requirement. Furthermore, factor analysis techniques facilitate the comparability of the responses of specified groups (comparing for example respondents who agree that XBRL democratises financial reporting with respondents who disagree). Thus, the outcome of group comparisons and interpretations thereof can be supported statistically. The detail of how the scales are constructed and survey participants identified is set out in Chapter Four.

The matter of whether quantitative or qualitative data is an epistemic or technical choice is raised in this chapter. The semantic differential is a research method that generates quantitative data that are amenable to statistical interpretation. Figure 5 indicates that quantitative analysis is particularly suited to positivist-type research. However, the semantic differential was developed by Osgood, et al., (1957) with interpretive-type research in mind and is particularly suitable, therefore, for interpretive-type research. It is consistent with the methodological basis of the thesis and is the most suitable method of data collection given the research requirements and constraints. Thus, the choice of the semantic differential is regarded by the researcher as a technical rather than an epistemic choice.

It is acknowledged that other research methodologies could be used for investigating the relationship between financial reporting and XBRL as an emergent technology, particularly those that have a natural fit with interpretive and critical methodologies such as SSK or Habermasian critical theory. Other research methods that are suitable to the emergent stage of a phenomenon include, in particular, case studies, interviews with influential individuals and field research. These approaches remain useful and retain the potential to complement the approach taken in this thesis.

In relation to positivism, there is little question that positivism, as a research paradigm, has contributed significantly to the development of knowledge over several centuries. However, positivism is not necessarily the only or the best option when researching the effects of an emerging technology. Positivism is more appropriate to research settings in which the research variables are well established. As Orlikowski and Baroudi (1991) state: *'The concepts present in the language of the positivist research philosophy cannot reflect the everyday language usage of the study participants, as these are considered too ambiguous and subjective.'* A positivist approach will therefore be more effective as and when interpretations of 'financial reporting', 'XBRL' and 'democratisation' are shared or, in other words, epistemically objective. The essence of the research, however, is that the meanings of these concepts may be contestable.

Overall, Orlikowski and Baroudi (1991) would categorise the position adopted in this thesis as the 'weak interpretive' school: *'In the 'weak' constructionist view, the researcher attempts, through various data collection techniques, to understand the existing meaning systems shared by the actors, and thereby interprets their action and events in her recounting.'* Furthermore, *'From the viewpoint of weak constructionism,*

interpretive research is understood to complement positivist research, that is, by generating hypotheses for further investigation, and by filling in the knowledge gaps that positivist research cannot attend to.' Thus, it is anticipated that the outcomes of this thesis may be used to support meaningful research into the effects of emerging technologies. They may helpfully constrain researchers against reliance on unsupported rhetoric and the intuitive appeal of technological determinism.

Chapter Four sets out the detail of the research question and specifics of the research methods.

Chapter Four: Research Question and Procedures

4.1 Introduction

The purpose of this chapter is to set out the specifics of the research question and the procedures employed to answer it. The literature review chapter provides the backdrop to the research question, firstly in terms of identifying the subject domains within which the thesis is set and secondly, critically reviewing the relevant body of accounting and IS literature. The research methodology chapter sets out the nature and significance of methodology in general, the reasons for the particular philosophical orientation adopted by the researcher and the choice of research methods considered.

Based on a belief that democracy, IT and financial reporting are underpinned by contingent social realities, this thesis incorporates an interpretive perspective as the most appropriate methodology. In the context of Searle's (1995) theory of institutional reality, the investigation becomes a matter of whether the democratisation of financial reporting due to XBRL may be reasonably concluded to be an institutional fact. This chapter formally states the research question, expresses it in the context of Searle's (1995) institutional reality and sets out the details of the procedures undertaken to answer the question.

The research procedures include an explanation of the selection of the sampling frame. In the absence of an obvious sampling frame, the criteria for inclusion in the research sample and the process whereby suitable individuals are identified are set out.

This chapter also sets out how Osgood, et al.,'s (1957) general semantic differential techniques and factor analysis are applied to the specific requirements of this thesis.

The semantic differential scales that are selected on an *a priori* basis are tested and finalised by reference to a pilot sample of survey respondents. The pilot study therefore contributes to finalising the semantic differential instrument in addition to rehearsing the data collection procedures.

Reliability and validity matters are also addressed as part of the instrument finalisation process. The procedures that provide comfort in terms of the reliability of the instrument, the reliability of the respondents and the validity of the data are explained.

4.2 Research question

The research question is stated as follows:

Does XBRL democratise financial reporting?

Alternative phrasings of the research question could be ‘Can XBRL democratise financial reporting?’ or ‘Will XBRL democratise financial reporting?’ It is concluded that ‘does’ is the most appropriate term with which to begin the research question. The term ‘can’ implies merely the possibility rather than the actuality of democratising financial reporting. It could be argued that, as there is always a possibility of democratisation, a research question that begins with ‘can’ is unlikely to discriminate usefully between respondents for research purposes.

The term ‘will’ pre-supposes that the democratisation of financial reporting is only a matter for the future. For some however, the democratisation of financial reporting may already be a reality. The research question should reflect this possibility. Beginning the research question with the term ‘does’ focuses the question on the current status of

XBRL. This facilitates the possibility that XBRL may be a current reality for some but not for others. It also facilitates longitudinal studies of the development of XBRL whereby the same question may be posed over time.

The research question could also be expressed in terms of whether XBRL democratises business reporting rather than financial reporting. However, the focus of this thesis is financial reporting. XBRL was originally conceived as an electronic standard for financial reporting specifically and was initially called ‘Extensible Financial Reporting Mark-up Language’ (XFRML). Furthermore, a significant proportion of the XBRL taxonomies that have been developed to date are financial reporting taxonomies. It is argued, therefore, that XBRL is likely to be of most significance in a financial reporting context. As XBRL matures, it may become equally significant to other aspects of business reporting.

Using Searle’s (1995) formula for status functions, the research question is restated:

Does X count as Y in context C?

where

X = ‘financial reporting’

Y = ‘democratised’

C = ‘XBRL’

Thus, there is an examination of whether XBRL fulfils the role of a ‘*symbolising move*’ (Searle 1995, p.71) and, thereby, collectively assigns financial reporting with the status

of being democratised. As such, the research question investigates whether the democratisation of financial reporting is an example of Searle's (1995) institutional reality.

If the concepts included in the research question could be assumed to be epistemically objective phenomena, the question of whether XBRL democratises financial reporting could be answered by reference to a simple analysis of the responses to the research question. However, the potential for different interpretations of 'financial reporting', 'democratisation' and 'XBRL' means that respondents may not have the same interpretation of the research question. In order to compare responses to the substantive assertion meaningfully, it is necessary to obtain sufficient evidence that respondents' interpretations of the concepts are sufficiently shared. This is achieved by determining the epistemic status of each of the concepts included in the research question.

The epistemic status of each of the concepts is determined by constructing and comparing connotative interpretations for each of 'XBRL', 'democratisation' and 'financial reporting' by reference to Osgood, et al.,'s (1957) semantic differential. In the circumstance that interpretations of the concepts are evidently shared within and between social groups, the concepts may be argued to be epistemically objective. Comparisons of responses to the research question are problematic on the basis that there is no dispute, in connotative terms, as to how the research question is interpreted.

However, the absence of sufficiently shared interpretations necessarily results in conclusions of epistemic subjectivity. In this circumstance, there is evidence of different interpretations of the research question, thereby potentially resulting in responses that may not be directly comparable. The research challenge is, therefore, to

identify and manage the potential existence of more than one interpretation of the research question.

It is for this reason that the semantic differential technique is used to measure the connotative meaning of each of the concepts. The semantic differential technique offers an interpretive framework within which it becomes possible to conclude whether or not the concepts included in the research question are interpreted in the same way by different groups of individuals. The issue is significant because epistemic objectivity of all the concepts is required in order to accept 'XBRL democratises financial reporting' as an institutional fact.

4.2.1 Determination of the epistemic status of concepts

Whether an interpretation of a given concept is sufficiently shared within and between groups must be examined using the semantic differential at two levels: (i) determining a valid and reliable interpretive framework for the concept and (ii) establishing whether there are significant differences between respondents' factor scores for the concept.

The interpretive framework of a concept, in terms of number and type of factors, is firstly identified. It maps the semantic space within which the concept is interpreted. A reliable and valid interpretive framework is required for each of 'XBRL', 'financial reporting' and 'democratisation'.

The determination of an interpretive framework is not, in itself, sufficient evidence that all respondents have the same understanding of a concept. Assuming the existence of a reliable and valid interpretive framework, equivalence of interpretation is determined by whether or not there are statistically significant differences between respondents' factor

scores²³ for a given concept. If there are no significant differences, it may be concluded that respondents effectively interpret the meaning of a concept to be at a similar location within the same interpretive framework. In other words, there is a shared interpretation of the concept and the concept may be reasonably concluded to be epistemically objective.

Whether the interpretation of a concept by one group of respondents differs significantly from another group is determined as follows:

- A factor analysis of the first group of respondents' data is undertaken to generate a multi-dimensional interpretive framework. An equivalent factor analysis is undertaken for the second group of respondents.
- Two sets of factor scores are calculated for **all** respondents based on the interpretive frameworks of each of the first and second groups. The two sets of factor scores are then correlated with each other.
- A correlation threshold of 0.894 is commonly used to test within- and between-group comparability of factor scores (Davies, et. al., 2004, Houghton, 1988; Everett, 1983). According to Everett (1983), a correlation of 0.894 or greater indicates that 80%²⁴ or greater of the variability in responses by two groups is common to each of the groups. Thus, a correlation between the two sets of factor scores in excess of 0.894 indicates that the interpretation of the concept by the

²³Recall from section 3.6.2.2 that a factor score locates a respondent's interpretation of a concept in its semantic space. For example, in a three-dimensional semantic space, a factor score may be perceived as (x,y,z) coordinates. The x, y and z values are the outputs of a factor analysis process and are derived from the semantic differential scale ratings indicated by a respondent.

²⁴0.894 squared

first group does not differ significantly from the interpretation of the same concept by the second group. The structure of the interpretive framework and the distribution of factor scores within the framework for the first group must be very similar to the second group in order to generate a strong correlation with each other. The lower the correlation however, the more significant is the difference in concept interpretation in terms of the structure of the interpretive framework and/or the distribution of factor scores within the framework. The 0.894 threshold is adopted in this thesis in order to determine the epistemic status of concepts. It is argued that it is an appropriate benchmark for concluding whether or not interpretations of concepts by two groups are effectively the same as each other.

The primary basis upon which respondents are categorised is by reference to responses to the research question. For example, the interpretations of respondents who believe that XBRL democratises financial reporting may be compared with those of respondents who do not believe XBRL democratises financial reporting in order to assess whether their respective beliefs are based on comparable interpretations of the research question.

In summary, although responses to the research question are interesting *per se*, it is not assumed that the concepts in the research question are epistemically objective phenomena. The semantic differential is applied for the purpose of determining whether the responses to the research question should be contextualised. Unless factor score correlations between identifiable groups of respondents are greater than 0.894, it is concluded that there is at least some element of epistemic subjectivity associated with the research question. It follows that, in the event that correlations are less than 0.894, it cannot be unambiguously concluded that XBRL fulfils the role of a ‘symbolising

move' (Searle 1995, p.71) for the purpose of assigning financial reporting with the status of being democratised. It also follows that, in such a circumstance, 'XBRL democratises financial reporting' should not be reasonably claimed to be an institutional fact.

The next section considers the selection and categorisation of individuals who constitute the main sample requested to complete the survey.

4.3 Selection and categorisation of research subjects

If a population is of a manageable size and the boundaries are reliably identifiable, it becomes possible to survey an entire population of subjects. However, practical constraints usually mean that subsets of populations are studied instead (Dorsten & Hotchkiss 2004, p.211; Saunders, et al., 2000, p.151). A subset of a population is a 'sample'.

There are two categories of samples: probability and non-probability (Beins 2004, p.100; Saunders, et al., 2000, p.152). A simple random sample, whereby each element of the population has an equal chance of being selected for the sample, is an example of a probability sample. Other examples of probability samples are systematic samples, stratified samples or cluster samples (Dorsten & Hotchkiss 2004, p.227; Beins 2004, p.102).

If the probability of an element being included in a sample cannot be specified, selection of the sample must be based on a technique that invariably requires some amount of subjective judgement, and hence is non-probabilistic. Examples of non-probability sampling techniques available to researchers include quotas, convenience,

purposive or snowball sampling (Dorsten & Hotchkiss 2004, p.230; Beins 2004, p.103; Saunders, et al., 2000, p.170).

The nature of the sample (probability or non-probability) is not a trivial matter, not least because the possibility of making inferences from research samples to populations relies on having a representative probability sample. In the absence of such, the assumptions that underpin statistical tests of association and significance may be violated and the possibility of generalising results may be consequently restricted (Smith 2003, p.56). While this might suggest that probability samples are always preferable, probability samples may be, in many cases, neither appropriate nor useful because, for some research questions, random samples may not capture the particular phenomena that are the focus of the research.

The practical possibilities must also be considered (Saunders, et al., 2000, p.178). For example, cost-benefit considerations frequently exclude the possibility of confirming the existence of a complete sampling frame for probability sampling purposes. Samples that start out as probability samples can also end up as non-probability samples due, for example, to non-responses. In much social research, true probability samples are, in fact, rare (Smith 2003, p.56).

Notwithstanding practical constraints, the principles of probability sampling can nevertheless provide a useful benchmark for sample selection that may not rigidly adhere to probability sampling techniques. Ultimately, the particulars of the research objectives should determine the choices of sampling techniques. As long as the researcher is mindful of the implications of the sampling techniques employed, and can

relate sampling choices to the research strategy, the research objectives remain achievable.

4.3.1 Identification of the research sample

The population of interest is the body of individuals who are knowledgeable regarding the nature and purpose of XBRL (specifically) and financial reporting technologies (generally). Whereas an understanding of financial reporting can be reasonably assumed based on recognised qualifications, there is no particular qualification (to date) that usefully distinguishes those who have XBRL knowledge. Furthermore, it is not a technology that belongs to one subject domain such as accountancy, IS or software engineering. Nor could it be said that XBRL is a phenomenon that is particular to only one or a few identifiable geographical areas. The selection of a sample of individuals who have the requisite understanding and experience of XBRL therefore requires specific consideration.

A sampling frame is a complete list of all cases in the population (Saunders, et al., 2000, p.154). The likelihood of compiling a reliable XBRL sampling frame is regarded as remote. The XBRL International website²⁵ provides a list of its members: *'approximately 550 leading companies, associations and agencies involved in providing or using business information'* (XBRL International, 2010a), categorised by geographical jurisdiction. This list could conceivably form the basis of a sampling frame on the basis that the membership may be representative of all the different organisations that have a stake in XBRL technology. It is not regarded, however, as a

²⁵<http://www.xbrl.org>

suitable choice because membership is neither a necessary nor a sufficient condition for knowledge of XBRL. In contrast to, say, a professional accountancy organisation²⁶, membership of XBRL International, in itself, is not indicative of awareness, understanding or knowledge of the subject matter. Members are obligated only to pay an annual membership fee. Furthermore, non-membership of XBRL International or a jurisdiction does not preclude XBRL expertise. This thesis relies on individuals having knowledge of XBRL that is sufficient for useful expressions of connotative meaning. Mere membership of an XBRL jurisdiction does not serve this purpose.

In the absence of an existing definitive and reliable sampling frame of XBRL-knowledgeable individuals, a suitable sample was compiled based on a number of sources. Because subjective judgement plays a role, it is therefore non-probabilistic in nature. A purposive sample is justifiable for studies in which it is effectively impossible to list all the elements of the population, for studies for which the research objectives are best achieved based on judgementally selected samples, or for studies that make use of a grounded theory approach (Dorsten & Hotchkiss 2005, p.233; Saunders, et al., 2000, p.174). The effective impossibility of objectively listing all individuals who have sufficient knowledge of XBRL aside, the research objectives of the thesis are better served, in any case, by judgementally identifying groups of individuals who can enhance the richness of the data.

Compilation of the sample is based on the following sources:

- (i) XBRL International Committees

²⁶Examples being Institute of Chartered Accountants in England and Wales (ICAEW) or Association of Chartered Certified Accountants (ACCA)

- (ii) IASC Foundation²⁷ XBRL Teams
- (iii) XBRL International Conference Participants
- (iv) XBRL Yahoo! Discussion Groups

4.3.1.1 XBRL International

'XBRL International is a not-for-profit consortium of approximately 550 companies and agencies worldwide working together to build the XBRL standard and promote and support its adoption...This collaborative effort began in 1998 and has produced a variety of specifications and taxonomies to support the goal of providing a standard, XML-based language for digitizing business reports in accordance with the rules of accounting in each country or with other reporting regimes such as banking regulation or performance benchmarking.'

- XBRL International (2010b)

The committee and jurisdictional structure of XBRL International, rather than the list of its members, is used as a source to identify suitable individuals for inclusion in the sample. XBRL committees and individuals listed as having jurisdictional leadership roles are assumed, for the purpose of this thesis, to be sufficiently conversant with XBRL by virtue of their active roles and responsibilities. The committees and jurisdiction contacts that fall in-scope are set out in Figure 6. Lists of the individual members of the committees are published on the XBRL International website.

²⁷International Accounting Standards Committee Foundation. On 1 July 2010, the IASC Foundation changed its name to the IFRS Foundation.

Figure 6: XBRL International committees

Name	Purpose	Number of members ²⁸
Steering Committee	“The Steering Committee is comprised of elected representatives from established jurisdictions and up to an equal number of At-Large representatives as well as one seat committed to the AICPA for a period of time. The At-Large representatives can represent the perspectives of supply chain communities or individuals who are greatly influential in the field of XBRL development and adoption” (XBRL International, 2010c).	24
Standards Board	“The XBRL International Standards Board is responsible for managing the production of the consortium's technical materials. It is charged with setting priorities for the creation of new material and ensuring all material is of a uniformly high quality, with the goal of accelerating adoption of XBRL around the world” (XBRL International, 2010d).	6
Best Practices Board	“The purpose of the XBRL International Best Practices Board is to manage the production, dissemination and continual improvement of work products that describe methods and processes for successful development, implementation, integration and use of XBRL specifications” (XBRL International, 2010e).	8
Working groups: Base specification and maintenance, Global Ledger, Formula, Rendering, International Public Sector, Versioning, Software Interoperability, Assurance, Jurisdiction Development, Accounting	“XBRL International has...working groups that are chartered to focus on specific deliverables related to continued development of the technology, taxonomies and awareness” (XBRL International, 2010f).	17 (Chairs and vice-chairs of working groups only)
Jurisdictions: Australia, Belgium, Canada, China, Denmark, France, Germany, IASB, Ireland, Italy, Japan, Korea, Luxembourg, Netherlands, Poland, Spain, South Africa, Sweden, United Arab Emirates, United Kingdom, United States, Europe, Direct Participants	“XBRL International is comprised of local jurisdictions which focus on the progress of XBRL in their region” (XBRL International, 2010g).	23 (jurisdictional leaders only)

It is possible to be a member of more than one committee so the number of committee and jurisdictional ‘seats’ does not exactly correspond to the number of unique

²⁸September 2008

individuals who occupy them. Fifty-eight individuals are members of the committees listed in Figure 6. These individuals are included in the research sample.

4.3.1.2 IASC Foundation XBRL Teams

The IASC Foundation established a core team to undertake XBRL-related projects, the purpose of which is to demonstrate whether and how IFRS XBRL taxonomies and a supporting framework can enhance the comparability of IFRS financial reporting. The XBRL Team is supported by an ‘Advisory Council’ and a ‘Quality Review Team’. By virtue of active participation, members of these groups are assumed to comprise XBRL-knowledgeable individuals and are therefore included in the sample. Figure 7 lists the IASC Foundation XBRL Groups.

Figure 7: IASC Foundation XBRL Groups

Name	Purpose	Number of members ²⁹
IASC Foundation XBRL Team	“The IASC Foundation XBRL Team is responsible for developing and maintaining the XBRL representations of the IFRSs, known as the IFRS Taxonomy. The IFRS Taxonomy is used around the world to facilitate the electronic use and exchange of financial data prepared in accordance with IFRSs” (IASCF, 2010b).	19 (including IASCF XBRL alumni)
XBRL Advisory Council	“The primary objective of the XBRL Advisory Council (XAC) is to provide strategic advice related to XBRL activities such as the development and adoption of taxonomies for International Financial Reporting Standards (IFRSs)” (IASCF, 2010c).	17
XBRL Quality Review Team	“The primary objective of the XBRL Quality Review Team (XQRT) is to review developed taxonomies in order to achieve the highest level of quality by providing input and offering practical recommendations to the XBRL Team on the usability of the IFRS Taxonomy from both a technology and financial reporting perspective” (IASCF, 2010d).	21

Fifty-two individuals are members of the core XBRL Team, the Advisory Council and the Quality Review Team. Of the 52, nine are also members of the XBRL International committees. Forty-three individuals are therefore added to the research sample.

²⁹September 2008

4.3.1.3 XBRL International Conference Participants

XBRL International hosts multi-day conferences. To date, there have been 20 conference events³⁰. The general objectives of a conference include roundtable discussion forums, education, training, presentations and demonstrations of the latest XBRL developments and implementations. The conference is marketed by XBRL International as '*a discussion among XBRL experts and professionals from various industries*' (XBRL International, 2010h). For the purpose of this thesis, the XBRL International Conference is regarded as a useful source of XBRL-knowledgeable individuals on the basis that being invited and actively participating in a global XBRL conference are indicators of experience and expertise on the part of the participants.

Conference participants are identified by reference to the online XBRL International Conference archives (XBRL International, 2010i). The archives list many, although not all, of the individual presentations made during conferences dating back to the 10th XBRL International Conference held in Belgium in November 2004. Summary descriptions of a selection of significant developments and presentations made during the first six years of the existence of XBRL dating back to 1998 and the first nine conferences dating back to April 2000 are available (XBRL International, 2010j).

From the available records, there are 347 individuals identifiable as having actively participated in one or more XBRL International conferences. Of these, 57 are members of the XBRL International Committees and/or the IASCF XBRL Teams. The remaining 290 individuals are potential additions to the research sample.

³⁰The most recent conference took place in Rome, Italy, in June 2010.

The inclusion of a conference participant in the research sample depends on the availability of contact details. While a large number of participants included contact details on the conference presentation slides, many did not. Contact details can be obtained by other means as follows:

- (i) The name of the conference participant may be combined with the term 'XBRL' and input to the most widely used internet search engine³¹.
- (ii) The search term 'XBRL' may be input to the 'LinkedIn' business networking website³². The result of a search for 'XBRL' undertaken by this researcher is a list of 338 registered users who (a) have stated a business interest in XBRL and (b) are within the researcher's network³³. This list may be reviewed for email contact details of individuals who are identified to have presented at an XBRL International Conference.
- (iii) The LinkedIn website provides a facility for registered users to become members of specialist groups. An 'XBRL Interactive Network' group exists and, as of the date of review for the purpose of this thesis³⁴, has 32 members³⁵. This listing may be reviewed for the email contact details of participants at XBRL International Conferences.

³¹<http://www.google.com>

³²<http://www.linkedin.com/>

³³The researcher's network is defined as the list of LinkedIn registered users who can contact the researcher through connections from up to three degrees of contact away.

³⁴This review was undertaken in November 2008. As of 30 June 2010, group membership increased to 1,437.

³⁵Although registered users of LinkedIn may list a business interest in XBRL and may also be members of the 'XBRL Interactive Network' group, membership alone is not regarded as a sufficient condition for inclusion in the research sample. In any case, 29 of the 32 members of the 'XBRL Interactive Network' are included in the research sample on the basis of the criteria used for inclusion anyway. The remainder have been included in the pilot testing sample.

- (iv) The websites of the organisations for whom conference participants work may be reviewed for email contact details.
- (v) The ‘contact us’ facility on individual corporate websites may be utilised to request the email address of an employee who participated in an XBRL International Conference. Requests include a reference to XBRL as the specific reason for the request.

The outcome of this process for the purpose of this thesis was the identification of contact details for 260 conference participants. They are included in the research sample.

4.3.1.4 XBRL Yahoo! Discussion Groups

Yahoo! discussion groups have been one of the primary methods of communication and collaboration among XBRL members. A Yahoo! Group is any web-based group that uses Yahoo! Inc. resources to share information, images or ideas privately (Yahoo!, 2010). Any online community that is established as a Yahoo! Group is categorised and described so that others who may share similar interests may become aware of its existence. Joining an established group depends on whether membership is classified as (i) ‘public’, in which case anyone can join without requiring moderator approval, or (ii) ‘members’, for which group membership follows application to and approval by a moderator.

For the purpose of this thesis, all Yahoo! groups for which XBRL is the subject matter of interest must be identified. This is achieved using the search function available at <http://groups.yahoo.com/>. Inputting ‘XBRL’ and ‘extensible business reporting

language' as separate search terms returns 104 established XBRL groups³⁶, details of which are listed as Appendix 4 to this thesis. Additional conditions are necessarily imposed on this initial listing in order to provide a filtered list of individuals who are fit for the research purpose: (i) the Yahoo! group language must be English; (ii) individual members must have posted one or more messages to a group during the 2008 calendar year; and (iii) messages posted in 2008 but assessed to be primarily spam³⁷ or merely self-introductory messages are excluded.

Thirty-nine of the 104 Yahoo! XBRL groups have a language setting that is other than English. This setting indicates the language that should be used by members when posting messages. Given the significance of English language meanings for this research project and the specifics of the methods used to elicit connotative meanings, there is the possibility that members of non-English language groups may not have the language capacity to provide reliable and comparable data. This does not mean, however, that members of these groups are necessarily excluded because multiple Yahoo! group membership is permitted. It is, in fact, common. Members of non-English language groups can therefore be members of English language groups as well.

Whereas membership of a group may indicate interest in XBRL³⁸, it does not necessarily indicate subject matter knowledge. In addition to group membership, evidence of group activity was deemed necessary. A review of the 65 English language

³⁶This search was undertaken in July 2008. As of 30 June 2010, the number of XBRL groups has not changed.

³⁷Spam is defined as a message that is indiscriminately sent to multiple mailing lists, individuals or newsgroups (Dictionary.com 2010h). Accordingly, a spam message posting to an XBRL group is identifiable as content that includes no reference to XBRL matters.

³⁸There is no monetary cost of membership of a Yahoo! XBRL Group.

groups reveals there had been no activity for 43 groups since the beginning of 2008³⁹. They are therefore considered dormant and are excluded.

The remaining 22 Yahoo! XBRL Groups are deemed active and relevant based on the existence of 2008 postings and English as the working language respectively. The next stage of refinement is to confirm that apparent group activity since the beginning of 2008 has XBRL substance and is not just attributable to spam. A review of five ‘public’ groups and eight ‘membership’ groups reveals that the average number of monthly postings in 2008 is less than two and/or overwhelmingly consists of spam⁴⁰. The prevalence of spam postings is assumed to be indicative of an effectively dormant group – no substantive XBRL messages and re-occurrences of spam indicate the absence of control by a group moderator. A further four ‘membership’ groups show an average message history of more than five messages per month during 2008, but due to group membership restrictions, it is not possible to directly inspect whether these messages consist of spam. Email requests sent⁴¹ to the group owners requesting confirmation of genuine XBRL postings resulted in two group owners responding and confirming that the postings are genuine. No response was received in relation to the other two groups.

The outcome of the Yahoo! XBRL Groups inspection process is the identification of seven English-language groups that are substantively XBRL-active. The final step is to identify the individuals who have actually contributed one or more messages to the group discussions, thereby distinguishing themselves from passive group members.

³⁹A group’s message history is available on the homepage of each Yahoo! group. The number of monthly postings since the establishment of the group is presented. For example, the message history of the xbrl-public group is available at <http://tinyurl.com/ya3vphq> [Accessed 30 June 2010]

⁴⁰‘Overwhelmingly’ meaning in excess of 90% based on visual inspection.

⁴¹Emails were sent 16 July 2008. The two responses received were received before 31 July 2008.

This is achieved by reviewing the messages posted to these groups in order to identify the contributors. Table 3 lists the substantively active groups containing the numbers of individuals who have contributed to group discussions during 2008.

Table 3: Substantively active Yahoo! XBRL Groups 2008

	Yahoo! Group Name	Established	Number of members⁴²	Public/ Membership	Number of contributing individuals
1	XBRL-Public	2000	1,327	Membership	59
2	XBRL-Dev	2004	456	Public	26
3	XBRL-COREP	2005	352	Public	33
4	XBRL-GL-Public	2004	126	Membership	7
5	XBRL-FINREP	2006	102	Membership	16
6	XBRL-CA-DOM	2002	21	Membership	Unknown
7	XBRL-CA-MarComm	2003	18	Membership	Unknown

The 141 identified contributors listed in Table 3 correspond to 119 individuals. Of these, 32 are members of the XBRL International Committees, the IASCF XBRL Teams and/or XBRL International Conference participants. The remaining 87 new individuals are therefore added to the research sample.

A summary of the resultant total research sample, by source, is provided in Table 4. The research sample comprises individuals who have been identified as having knowledge of XBRL based on membership of relevant groups. Membership of an XBRL Committee, an IASC Foundation XBRL Team or participation in an XBRL International conference is based on being invited and/or accepted. Whereas the threshold of knowledge is perhaps lower for XBRL Yahoo! Discussion Groups, the fact that there is significant overlap of membership between the sources indicates that each

⁴²These numbers include members whose email addresses are no longer valid. The numbers of group members who are actually receiving group messages are therefore less than indicated here.

is a useful source of XBRL-knowledgeable individuals. This is a positive indicator that authoritative XBRL knowledgeable individuals are included in the research sample.

Table 4: Research sample by source

Source	Cumulative number of identified individuals ⁴³
XBRL International Committees	58
IASC Foundation XBRL Teams	101
XBRL International Conference Participants	361
XBRL Yahoo! Discussion Groups	448

It is acknowledged that there are other sources for identifying relevant individuals. There is the possibility of searching and reviewing individual XBRL blogs⁴⁴ or generally searching for organisations that claim XBRL expertise but which are not represented in the sample. It is concluded that the four sources used provide an objective and replicable basis of sample selection. Although the sources were subjectively chosen by the researcher as the most likely to reveal XBRL-knowledgeable individuals, the process of selection of individuals from within the first three sources is an objective process. The criteria applied to filtering the XBRL Yahoo! discussion groups are subjective but regarded as consistent with achieving the qualitative requirements of the research sample, namely to include individuals who could potentially enhance the richness of the research data.

There are a number of additional individuals, regarded by the researcher to be XBRL-knowledgeable, who are excluded from the main research sample because they are not specifically identified as XBRL-knowledgeable based on one or more of the four

⁴³The figures are included on a cumulative basis for the reason that numerous individuals were identified in more than one source.

⁴⁴A blog is a personal chronological log of thoughts published on a webpage (Dictionary.com 2010i).

sources used. This is a consequence of a trade-off between (i) the objectivity and replicability of a sample selection process which minimises selection bias, and (ii) the subjective inclusion of individuals considered useful for the objectives of this thesis. The sample is not expanded further on the basis that subjective inclusion or exclusion would adversely affect the objective and replicable quality of the sample. Nevertheless, in order to benefit from the knowledge and experience of these particular individuals, they are included in the list of individuals who are requested to pilot test the semantic differential survey instrument.

4.4 Development of the semantic differential survey instrument

Although scale selection is ultimately a matter of judgement, Maguire (1973) provides a concise summary of the approaches to scale development that are evident in semantic differential literature (including the original semantic differential work undertaken by Osgood, et al., (1957)):

- (i) Review a thesaurus⁴⁵ for the purposes of identifying potential polar opposites that fit the particular context of the research and identifying suitably subtle adjectival synonyms;
- (ii) Review related studies from similar subject areas that have required a process of scale selection. Scales may be relevant if found to be useful in other studies from the same or similar area of enquiry;
- (iii) Review the literature for descriptive words and phrases. The literature may include both professional and academic work;

⁴⁵A thesaurus is a dictionary of synonyms and antonyms (Dictionary.com 2010j).

(iv) Ask people who are knowledgeable in the area to describe concepts.

Maguire's (1973) four sources are used as the basis of scale selection in this thesis.

4.4.1 Thesaurus review

Osgood, et al., (1957, p47) used Roget's Thesaurus⁴⁶ as an independent source of a logically exhaustive classification of word meanings. The outcome of this review process was 244 adjective pairs. This number reduced to 76 scales based on an assessment of effectively synonymous scales⁴⁷. These 76 scales are considered for utilisation in this thesis on the basis that they are the outcome of a methodical review of a comprehensive and authoritative resource. They are included as Appendix 28 to this thesis.

4.4.2 Review of semantic differential research in similar subject domains

Sections 3.6 and 3.7 set out the nature of a semantic differential instrument and its application in accounting and IS research. Development of the instrument has been, at various times, based on a brainstorming approach, triad procedures, or re-using Osgood, et al.,'s (1957) scales for the reasons that they '*possessed the highest factor loadings...and due to their stability across concepts, appeared frequently in previous research*' (Oliver, 1974). Use of the semantic differential in accounting and IS research provides the opportunity to review the scales that are not part of Osgood, et al.,'s (1957) original set and which would be particularly suited to the objectives of the thesis. For

⁴⁶1941 edition

⁴⁷The full listing of 244 scales and how they are categorised to reduce them to 76 is presented in Table 5 of Osgood, et al., (1957, p.53).

example, Haried (1973, 1972) utilises triad procedures to elicit scales specifically relevant to the financial reporting domain. Haried's (1973, 1972) scales were subsequently refined and used for accounting research purposes by Houghton (1988, 1987). A review of the application of the semantic differential to accounting research reveals 32 scales that were not previously listed by Osgood, et al., (1957). They are therefore included for consideration in this thesis and are listed as Appendix 29 to this thesis.

The IS studies are similarly reviewed in order to identify relevant semantic differential scales. Twenty-three potentially useful scales, with particular reference to Chin (2008), Katz and Aakhus (2002), Davis (1989), and Dickson and Slevin (1975), are considered for this thesis. They are listed as Appendix 30 to this thesis.

Investigations of the meaning of democracy using semantic differential techniques included Bishop (1999) and Kolouh-Westin (2002). In comparison to accounting and IS semantic differential studies, there appears to be a preponderance of Osgood, et al.,'s (1957) original scales included in democracy studies that incorporate the semantic differential. This may be attributable to the challenge of creating the cognitive structure of a contingent concept such as democracy. Consequently, researchers fall back on the generic semantic space provided by Osgood, et al.,'s (1957) original scales.

The outcome of the review of semantic differential studies in relevant subject areas is the identification of 55 scales for possible inclusion in the survey instrument. These scales have particular contextual relevance on the basis that they are sourced from research undertaken in similar subject domains.

4.4.3 Review of literature for relevant adjectives

The XBRL, democracy and financial reporting literatures are reviewed for adjectives that are frequently used in association with the concept. The adjectives may be utilised to describe the concept in terms of what it is or is not. Such adjectives may be therefore useful for mapping the concept's interpretive framework.

4.4.3.1 XBRL literature

The XBRL literature review in Chapter Two highlights the rhetoric that is frequently associated with new technologies. For the purpose of this section, the adjectives used to describe XBRL and its purported benefits are of particular interest. Two scales in particular are considered relevant to an investigation of the connotative meanings of XBRL:

- revolutionary – evolutionary
- democratising – not democratising

4.4.3.2 Democracy literature

The literature review chapter sets out how contingent meanings of democracy can depend on individual beliefs regarding the appropriate interplay between individual freedom and societal progress. The respective adjectival attributes associated with liberal and social democracy in literature are reviewed in order to identify potential semantic differential scales. Five scales in particular are considered relevant:

- individual – social
- liberating – constraining

- enhanced accountability – reduced accountability
- probable – improbable
- visible – invisible

4.4.3.3 Financial reporting literature

The scales identified by Haried (1973, 1972) and subsequently refined by Houghton (1988, 1987) are assessed to be directly relevant to the subject domain of financial reporting and are already included for consideration. Since Haried (1973, 1972), The Corporate Report (ASSC, 1975) was published, and since Houghton (1988, 1987), both the Framework for the Presentation and Preparation of Financial Statements (IASB, 1989) and The Statement of Principles for Financial Reporting (ASB, 1999) were published. Over time, the Corporate Report (ASSC, 1975) has come to be regarded as a seminal document in terms of its influence on the subsequent conceptual framework documents issued by the IASB and Accounting Standards Board (ASB) (Connolly 2006, p.5).

The conceptual framework documents, with a particular emphasis on the qualitative characteristics of financial information, are reviewed for additional adjectival descriptors that are associated with modern financial reporting. Two scales that refer to desirable qualitative characteristics of financial statements are:

- relevant – irrelevant
- reliable – unreliable

The outcome of the review of relevant literature is the identification of an additional nine scales that are not already included. One additional scale, ‘democratic–

undemocratic’, is included on the basis that the democratic status of ‘financial reporting’ (without specific regard to XBRL) is relevant to the objectives of this thesis.

4.4.4 Asking knowledgeable individuals to describe concepts

The input of knowledgeable individuals may be obtained on an *a priori* basis by means of brainstorming or the ‘triad’ procedures described by Haried (1972) and Triandis (1960). For the purpose of this thesis, a pilot study provides the opportunity to obtain the input of knowledgeable individuals in terms of identifying the scales that are most relevant to interpreting the concepts. Accordingly, an initial semantic differential survey instrument is constructed and pilot tested on individuals considered XBRL-knowledgeable. The scales that correlate most strongly with factors and which generate high communality coefficients⁴⁸ are concluded to be the scales identified by the knowledgeable individuals to be most relevant to interpreting the concepts.

The role and influence of the researcher in terms of constructing the initial semantic differential instruments is acknowledged but is argued to be no more subjective than other approaches (a brainstorming approach for example). Moreover, issues associated with a triad approach to instrument development include (i) the preponderance of evaluative scales that Osgood, et al., (1957) found, and (ii) the content validity⁴⁹ of the adjectives provided by the individuals. A preponderance of evaluative scales may reduce the likelihood of eliciting multi-dimensional interpretations of concepts. An example of the content validity issue is Haried (1972), who included seven freshman

⁴⁸ Recall from section 3.6.2.1 that a communality coefficient is an indication of the amount of variance in individual scale responses that is captured by the interpretive framework.

⁴⁹ If a test situation is representative of the actual situation the test is purported to represent, then the test situation has content validity (Groves and Savich, 1979).

home economics students, ten sophomore engineering students and 15 non-business majors in the sample of 65 triad procedures participants. Whether the scales elicited from these participants are valid in terms of being adjectival descriptions of financial statements by knowledgeable individuals is a moot point.

4.4.5 Twenty five semantic differential scales for each concept

The total number of scales identified by reference to Osgood, et al.,'s (1957) thesaurus review, supplemented by reviews of adjectives included in the XBRL, democracy and financial reporting literatures is 141. This number is capped at 25 scales for each of the 'XBRL', 'financial reporting' and 'democratisation' concepts in order to present a realistic number of scales to a sample of individuals who are likely to allocate limited time to survey completion. The criteria used to reduce the number of scales are as follows:

- Scales commonly and consistently used in semantic differential studies and found to be significant in terms of constructing stable multi-factor interpretations. Examples are '*good–bad*', '*strong–weak*' and '*active–passive*'. These scales are regarded as 'anchor' scales.
- Scales provisionally assessed to be contextually relevant to the concepts of 'XBRL', 'democracy' and 'financial reporting'. The additional scales identified from the literature reviews and previously used in accounting and technology studies are regarded as relevant for this purpose.
- Scales that contribute to testing the reliability and validity of the survey instrument;

- Scales that contribute to testing the reliability and validity of the survey respondents.

The reduction in the number of scales to twenty-five (as opposed to a greater or lesser number) is based on researcher assessment of the maximum number of scales that could be reasonably included in a pilot survey instrument without compromising the survey response rate. Twenty-five scales is at the upper end of the number included in semantic differential research studies⁵⁰. Allowing for a reduction in the number of scales after the pilot study, the number of scales included in a finalised survey instrument would be still sufficiently numerous to map the interpretive frameworks effectively.

The scales included in the survey instrument for the purpose of interpreting each of the ‘financial reporting’, ‘XBRL’, and ‘democratisation’ concepts are listed in Tables 5, 6, and 7 respectively.

⁵⁰According to Osgood, et al., (1957:80), a semantic differential instrument comprising ten scales would be usual. According to Heise (1970), four scales per dimension can provide adequate coverage and sensitivity for most research purposes, which suggests a total of 12 to 16 scales. Arnold, et al., (1966) state that a semantic differential instrument ‘*usually consists of from four to twelve pairs of polarized adjectives*’. In relation to accounting studies that utilise a semantic differential instrument, Haried (1972) included 33 scales, Houghton (1988) included 22 and Oliver (1974) included ten.

Table 5: 'Financial reporting' scales

	Bi-polar scale		Basis of inclusion
1	good	bad	common 'evaluative' anchor scale
2	beneficial	adverse	good-bad synonym, Houghton (1988)
3	adequate	inadequate	accounting literature
4	informative	uninformative	accounting literature
5	accountable	unaccountable	accounting literature
6	influential	not influential	accounting literature
7	reputable	disreputable	common scale
8	healthy	sick	common scale
9	valuable	worthless	accounting literature
10	honest	dishonest	common scale
11	powerful	weak	common 'potency' anchor scale
12	strong	weak	powerful-weak synonym ⁵¹ , Houghton (1988)
13	timely	untimely	accounting literature
14	opaque	transparent	common scale
15	objective	subjective	accounting literature, Houghton (1988)
16	active	passive	common 'activity' anchor scale, Houghton (1988)
17	convergent	divergent	accounting literature
18	easy	difficult	simple-complex synonym
19	simple	complex	accounting literature, common scale
20	flexible	inflexible	accounting literature, Houghton (1988)
21	dynamic	static	Houghton (1988), Haried (1972)
22	certain	uncertain	accounting literature
23	democratic	undemocratic	specific research objective
24	relevant	irrelevant	accounting literature
25	reliable	unreliable	accounting literature

⁵¹The significance of synonym scales is explained in section 4.6.2.

Table 6: 'XBRL' concept scales

	Bi-polar scale		Basis of inclusion
1	good	bad	common 'evaluative' anchor scale
2	superior	inferior	good-bad synonym
3	progressive	regressive	XBRL literature, common scale
4	warranted	unwarranted	XBRL literature
5	believing	sceptical	XBRL literature, common scale
6	optimistic	pessimistic	XBRL literature
7	clear	obscure	XBRL literature
8	efficient	inefficient	Chin (2008), XBRL literature
9	effective	ineffective	Chin (2008), XBRL literature
10	strong	weak	common 'potency' anchor scale
11	powerful	impotent	strong-weak synonym
12	available	unavailable	XBRL literature
13	successful	unsuccessful	XBRL literature, common scale
14	meaningful	meaningless	common scale
15	liberating	constraining	XBRL literature, common scale
16	productivity increasing	productivity decreasing	Chin (2008)
17	active	passive	common 'activity' anchor scale
18	flexible	rigid	Chin (2008)
19	simple	complex	XBRL literature, common scale
20	easy	difficult	Chin (2008), simple-complex synonym
21	transparent	opaque	XBRL literature, common scale
22	usable	cumbersome	Chin (2008)
23	helpful	unhelpful	Chin (2008)
24	revolutionary	evolutionary	XBRL literature
25	democratising	not democratising	XBRL literature

Table 7: 'Democratisation' concept scales

	Bi-polar scale		Basis of inclusion
1	good	bad	common 'evaluative' anchor scale
2	complete	incomplete	common scale
3	timely	untimely	Bishop (1999), common scale
4	meaningful	meaningless	common scale
5	successful	unsuccessful	Bishop (1999), common scale
6	complete	incomplete	Bishop (1999), common scale
7	positive	negative	good-bad synonym, common scale
8	safe	dangerous	common scale
9	strong	weak	common 'potency' anchor scale
10	vigorous	feeble	strong-weak synonym
11	liberating	constraining	democracy literature, common scale
12	real	imaginary	Houghton (1988)
13	active	passive	common 'activity' anchor scale
14	vibrant	still	active-passive synonym
15	static	dynamic	Houghton (1988), Haried (1972)
16	stable	changeable	Bishop (1999), common scale
17	public	private	democracy literature
18	probable	improbable	democracy literature
19	certain	uncertain	common scale
20	visible	invisible	democracy literature
21	near	far	common scale
22	enhanced accountability	reduced accountability	democracy and accounting literature
23	formed	formless	Bishop (1999)
24	true	false	Bishop (1999)
25	individual	society	democracy literature

Tables 5, 6, and 7 include scales that (i) are common to semantic differential studies and have been consistently useful, (ii) have an identifiable basis in accounting, technology acceptance or democracy literature and language, (iii) are tentatively presumed to capture multi-dimensional interpretations consistent with Osgood, et al.,'s (1957) measurement of meaning, and (iv) facilitate an assessment of the reliability and validity of the survey instrument and respondents. These scales, selected on an *a priori* basis, are oriented towards adjectives that establish and discriminate between connotative interpretations of 'financial reporting', 'XBRL' and 'democratisation'.

The inclusion of some and exclusion of other scales by the researcher is acknowledged as subjective. Other researchers may include or exclude different scales and argue a reasonable case for doing so. Regardless of the approach taken to the development of a semantic differential, the usefulness, reliability and validity of the instrument cannot be proven before it is used to collect data. The quality of the data and richness of the interpretations provide evidence to support the quality of the instrument.

4.5 Research procedures

The research survey is undertaken in two stages: (i) pilot testing the initial semantic differential survey instrument based on 25 scales for each concept and (ii) main data collection based on a relevant, reliable and valid finalised instrument.

4.5.1 Pilot study procedures

The general purposes of survey pilot testing are to (i) refine the survey so that respondents are likely to be able to complete it, and (ii) demonstrate that the survey is capable of generating useful responses from the target population. A pilot test can also provide evidence regarding the validity and reliability of the data to be collected (Smith 2003, p.122; Saunders, et al., 2000, p.305).

In the case of this thesis, the pilot study is an integral part of finalising the construction of the survey instrument as well as rehearsing the data collection procedures. Whereas twenty-five semantic scales are selected for each concept on an *a priori* basis in a manner that is consistent with semantic differential literature, the practical usefulness of each scale is demonstrated only if it contributes to mapping the semantic space for a

given concept. Accordingly, the pilot study fulfils the role of identifying the most useful semantic scales for inclusion in the finalised instrument.

Removal of the scales that are less useful in terms of mapping a concept's semantic space also have the effect of reducing the number of scales and shortening the time required to complete the survey. This is a practical consideration given the limited time that respondents are likely to allocate to the survey.

During January and February 2009, ninety-nine individuals were requested by email to undertake the web-based pilot survey. The survey was made available online using standard web-based survey software⁵². The sample of pilot test individuals comprised (i) individuals known to and assessed by the researcher to be aware of and knowledgeable about XBRL, and (ii) individuals identified during the process of identifying the main research sample but who did not formally meet all the criteria for inclusion in the main research sample.

The pilot survey instrument is included as Appendix 5 to this thesis.

4.5.2 Pilot study outcomes

Seventy-two responses were completed by the end of February 2009, which corresponds to a 73% response rate. Factor analysis of the data for each concept was undertaken in order to identify an interpretive framework for each concept and the underlying scales that contribute most significantly.

⁵²QuestionPro Survey Software. Available at: <http://tinyurl.com/3yomp5s> [Accessed 30 June 2010]

Table 8 lists the correlations between each semantic differential scale and the set of factors extracted for the ‘financial reporting’ concept. Six factors are identified as having eigenvalues greater than one⁵³.

Table 8: Pilot six-factor analysis of the ‘financial reporting’ concept

Correlations between scales and factors:	F1	F2	F3	F4	F5	F6	h²
honest - dishonest	0.836	0.102	0.020	0.015	0.040	-0.046	0.714
reliable - unreliable	0.825	0.173	0.085	0.142	-0.076	-0.042	0.745
reputable - disreputable	0.680	0.022	0.158	0.444	0.016	0.036	0.686
adequate - inadequate	0.655	0.242	0.218	0.079	0.145	-0.021	0.562
healthy - sick	0.623	0.239	0.185	0.333	0.172	0.230	0.673
transparent - opaque	0.620	0.258	0.046	0.176	0.145	0.492	0.746
valuable - worthless	0.119	0.844	0.087	0.061	-0.026	0.118	0.753
informative - uninformative	0.199	0.730	0.197	0.078	-0.092	0.075	0.632
powerful - weak	0.078	0.697	0.051	-0.047	-0.011	0.359	0.626
beneficial - adverse	0.204	0.639	0.434	0.244	-0.159	-0.012	0.723
relevant - irrelevant	0.252	0.532	0.376	-0.081	0.377	-0.020	0.637
strong - weak	0.450	0.509	0.264	0.082	0.265	0.048	0.611
influential – not influential	0.025	0.413	0.722	0.104	0.179	0.054	0.738
good - bad	0.304	0.204	0.684	0.258	0.119	0.223	0.733
dynamic - static	0.422	0.116	0.565	-0.362	-0.123	0.285	0.737
active - passive	0.487	0.330	0.522	-0.190	0.076	0.294	0.747
objective - subjective	0.176	-0.042	0.003	0.710	0.348	0.035	0.659
accountable - unaccountable	0.293	0.176	0.080	0.656	-0.099	0.016	0.563
easy - difficult	-0.002	-0.117	0.325	0.124	0.794	0.047	0.767
simple - complex	0.060	-0.055	-0.156	-0.048	0.656	0.502	0.715
certain - uncertain	0.279	0.442	-0.086	0.304	0.564	-0.090	0.698
democratic - undemocratic	-0.001	0.167	0.097	0.449	0.140	0.741	0.807
flexible - inflexible	-0.024	0.134	0.272	-0.184	0.005	0.671	0.577
timely - untimely	0.422	0.468	0.317	-0.356	0.074	0.104	0.640
convergent - divergent	0.441	0.498	0.196	0.041	0.300	-0.077	0.578
Variability explained (%)	17.955	15.991	10.043	8.412	8.071	7.805	
Cumulative variability (%)	17.955	33.946	43.990	52.402	60.473	68.277	

The information provided in Table 8 statistically supports an assertion that 25 scales can be reduced to six latent factors whilst retaining 68.277% of the variability of sample

⁵³Recall from section 3.6.2.1 that an eigenvalue is a measure of the variability in the interpretation of a concept that is captured by each factor. A factor is significant if its eigenvalue is greater than one.

responses. Each factor may be perceived as a dimension of the connotative interpretation of the concept.

The dimensions of 'financial reporting' are most significantly characterised by scales for which the factor correlations are highlighted in red in each column. The most useful individual scales are therefore those that have high positive or negative correlations (because they generate high h^2 communality coefficients). Low positive or negative correlations are indicative of scales that are not as relevant in terms of discriminating interpretations of the concept.

It is also necessary to ensure that the significant factors are represented in the finalised survey instrument. Subject to reliability and validity considerations, this is achieved by the inclusion in the final instrument of scales that correlate highly with a significant factor. The first three factors are particularly significant.

Table 9 similarly lists the correlations between each semantic differential scale and the set of factors extracted for the 'XBRL' concept. Six factors are identified as having eigenvalues greater than one. The table is sorted according to scales for which the correlation with a factor is greater than 0.50.

Table 9: Pilot six-factor analysis of the ‘XBRL’ concept

Correlations between variables and factors:	F1	F2	F3	F4	F5	F6	h²
helpful - unhelpful	0.817	0.308	0.108	0.126	0.024	-0.017	0.790
meaningful - meaningless	0.776	0.202	0.205	0.190	0.113	-0.118	0.747
productivity increasing - productivity decreasing	0.640	-0.006	0.291	0.045	0.256	0.206	0.604
liberating - constraining	0.611	-0.175	0.168	0.394	0.342	0.056	0.707
strong - weak	0.593	0.487	0.139	0.373	-0.089	0.157	0.780
believing - sceptical	-0.008	0.794	0.121	0.052	0.097	-0.047	0.660
transparent - opaque	0.365	0.657	0.043	0.212	-0.095	0.023	0.622
successful - unsuccessful	0.101	0.566	0.310	0.319	0.143	-0.106	0.560
progressive - regressive	0.428	0.540	-0.220	-0.075	0.081	0.355	0.661
democratising - not democratising	0.289	0.537	0.147	-0.006	0.388	0.240	0.602
good - bad	0.257	0.512	0.129	0.062	0.514	0.351	0.737
simple - complex	-0.022	-0.067	0.793	0.012	-0.143	0.046	0.656
easy - difficult	-0.065	0.038	0.774	0.111	0.008	0.019	0.618
clear - obscure	0.276	0.264	0.708	-0.221	-0.037	-0.066	0.702
usable - cumbersome	0.345	0.164	0.691	0.017	0.035	-0.214	0.670
efficient - inefficient	0.360	0.175	0.620	0.240	-0.135	0.370	0.758
active - passive	0.294	0.236	0.002	0.723	0.123	0.127	0.696
flexible - rigid	0.392	0.014	-0.073	0.601	0.095	0.158	0.554
available - unavailable	-0.185	0.444	0.310	0.533	0.057	-0.223	0.664
warranted - unwarranted	0.065	0.074	-0.158	0.105	0.835	0.031	0.744
superior - inferior	0.451	0.121	-0.153	0.036	0.527	0.288	0.603
revolutionary - evolutionary	-0.030	-0.084	0.000	0.042	0.135	0.791	0.653
powerful - impotent	0.093	0.451	-0.056	0.277	0.203	0.534	0.618
effective - ineffective	0.159	0.203	0.386	0.390	-0.093	0.369	0.513
optimistic - pessimistic	0.472	0.292	-0.164	0.302	0.382	0.056	0.576
Variability (%)	15.79	13.50	13.22	8.52	7.69	7.28	
Cumulative variability (%)	15.79	29.29	42.51	51.02	58.71	65.98	

The information provided in Table 9 statistically supports an assertion that 25 measured variables can be reduced to six underlying factors whilst retaining 65.98% of the variability of sample responses. The first three factors capture a disproportionately large amount of the variability in responses (almost twice as much as the next three factors).

Subject to reliability and validity considerations, the scales selected for inclusion in the finalised instrument for the ‘XBRL’ concept are those that correlate highly with factors and which ensure that the significant factors are represented.

The correlations between each semantic differential scale and the set of factors extracted for the ‘democratisation’ concept are listed in Table 10.

Table 10: Pilot seven-factor analysis of the ‘democratisation’ concept

Correlations between variables and factors	F1	F2	F3	F4	F5	F6	F7	h ²
vigorous - feeble	0.860	0.052	0.175	0.045	-0.005	0.069	-0.056	0.783
strong - weak	0.709	0.228	0.245	0.369	-0.058	0.158	0.171	0.808
successful - unsuccessful	0.669	0.131	0.264	0.327	0.064	0.141	0.203	0.706
dynamic - static	0.621	0.271	0.380	-0.022	0.246	-0.049	0.071	0.672
meaningful - meaningless	0.567	0.127	0.447	-0.077	0.375	0.014	0.059	0.687
active - passive	0.530	0.278	0.255	0.188	0.331	-0.171	0.319	0.699
timely - untimely	0.066	0.759	0.152	0.192	-0.026	0.042	-0.087	0.650
complete - incomplete	0.281	0.708	-0.157	0.190	0.079	0.311	-0.028	0.745
whole - partial	0.216	0.629	-0.099	0.054	0.025	0.380	0.316	0.700
society - individual	-0.084	0.587	0.203	0.049	0.399	-0.068	0.046	0.561
enhanced accountability - reduced accountability	0.195	0.566	0.164	0.071	0.264	-0.310	0.330	0.664
public - private	0.267	0.515	0.433	-0.039	0.146	0.087	-0.090	0.562
probable - improbable	0.251	0.515	0.456	0.075	0.109	0.106	-0.132	0.582
good - bad	0.292	0.087	0.828	0.220	0.203	0.054	0.101	0.881
positive - negative	0.278	0.146	0.816	0.282	0.108	0.047	0.153	0.882
liberating - constraining	0.248	0.041	0.670	-0.004	-0.143	0.293	0.285	0.700
safe - unsafe	0.161	-0.050	0.312	0.731	0.288	0.255	-0.106	0.819
near - far	0.086	0.323	0.098	0.721	-0.097	-0.132	0.135	0.687
true - false	0.469	0.288	-0.016	0.507	0.219	-0.111	0.113	0.633
real - imaginary	0.195	0.186	0.106	0.181	0.842	0.049	0.142	0.849
certain - uncertain	0.079	0.164	0.029	-0.129	0.539	0.683	0.084	0.815
formed - formless	0.023	0.127	0.286	0.071	-0.091	0.798	0.105	0.759
visible - invisible	0.003	-0.034	0.104	0.130	0.056	0.272	0.854	0.835
vibrant - still	0.388	0.011	0.253	-0.077	0.224	-0.160	0.574	0.625
Variability (%)	15.24	13.36	13.20	7.89	7.76	7.64	7.01	
Cumulative variability (%)	15.24	28.60	41.80	49.69	57.45	65.09	72.10	

The information provided in Table 10 statistically supports an assertion that 24 measured variables⁵⁴ can be reduced to seven underlying factors whilst retaining 72.10% of the variability of sample responses. As is the case with the ‘financial reporting’ and ‘XBRL’ concepts, the first three factors capture a disproportionately large amount of the variability in responses.

Subject to reliability and validity considerations, the scales selected for inclusion in the final instrument for the ‘democratisation’ concept are the scales that correlate most strongly with each factor whilst ensuring adequate factor coverage.

4.6 Reliability and validity of the procedures used to collect data

It is a general requirement of academic research, regardless of the methodologies used, that the means of collecting the data upon which findings and conclusions are based should be reliable and valid. The reliability of an instrument is the degree to which the same scores can be repeatedly produced over time (Grove & Savich, 1979; Osgood, et al., 1957, p.126). Reliability is therefore about consistency. If an instrument is reliable, repeated measurements on the same subject should return consistent data each time (Dorsten & Hotchkiss 2005, p.78; Beins 2004, p.106; Smith 2003, p.40).

The validity of an instrument is a matter of whether it actually measures what it purports to measure - whether the instrument is useful for what is specifically required (Dorsten & Hotchkiss 2005, p.76; Grove & Savich, 1979). Comparatively sparse explanations of the reliability and validity of the instruments used to capture the purported attitudes is

⁵⁴There were 25 scales originally but one was corrupted during iterations of pilot testing. The corrupted scale is omitted from further consideration.

the basis of recurring criticism of attitude research in accounting and economics (Grove & Savich, 1979). However, when reliable and valid instruments are demonstrably employed, the findings can significantly enhance the goal of theoretical advancement.

4.6.1 Reliability of the data collection instrument

Two significant considerations regarding reliability are (i) statistical reliability of the instrument and (ii) reliability of survey respondents. The objective of reliability testing is to provide statistical evidence that the data collected are more likely to reflect the true scores of respondents and less likely to be attributable to measurement error. Measurement error includes errors in data that are attributable to individuals being less than perfect in responding to a survey (Beins 2004, p.106).

Instrument reliability is a matter of whether consistent results are returned for comparable but independent individuals or groups. In the case of a semantic differential instrument, the factors that are claimed to be applicable to concepts should be consistently reproduced for independent groups. As Everett (1983) states: *‘There is a considerable difference between demonstrating that a data set contains factors and confirming that we have extracted them from the data accurately and reliably’*. Accordingly, it is necessary to show that the interpretive frameworks generated for the ‘financial reporting’, ‘XBRL’ and ‘democratisation’ concepts based on the pilot sample are stable in order to conclude that the instrument can be reliably deployed for data collection from the main research sample.

The stability of interpretive frameworks generated by a semantic differential instrument can be tested by performing split-half correlations whereby survey respondents are

randomly split into two halves and a correlation coefficient calculated for the two data sets (Houghton, 1987; Everett, 1983; Nunnally, 1978). A correlation greater than 0.894 indicates that the instrument generates reliable results for similar yet independent groups of respondents and thereby provides confidence that the likelihood of measurement error due to instrument imperfection is significantly reduced.

The procedure followed is as set out in Everett (1983). Two random groups of 30 pilot survey respondents are created. Using the 15 most significant scales identified for each of ‘financial reporting’, ‘XBRL’ and ‘democratisation’, each group is subjected to identical factor analysis. The objective is to confirm that, for each concept, both groups generate comparable interpretive frameworks. The frameworks may be regarded as comparable if, when the factor pattern coefficients⁵⁵ generated for each group are in turn applied to the combined sample of 60 respondents, the correlation between the two sets of factor scores for the combined sample exceeds 0.894. It is thereby possible to conclude on the reliability of an interpretive framework on the basis that highly stable groups, when split into random halves and factor analysed, generate factor scores that correlate strongly with each other.

4.6.1.1 Stable factor structure⁵⁶ for the ‘financial reporting’ concept

The outcome of split-half correlation testing for the ‘financial reporting’ concept is set out in Tables 11 and 12.

⁵⁵Recall from section 3.6.2.2 that factor pattern coefficients are the weights that are applied to the measured variables (scale ratings) in order to obtain factor scores. They are the equivalent of beta weights in regression analysis.

⁵⁶Recall from section 3.6.2 that ‘factor structure’ and ‘interpretive framework’ are interchangeable terms.

Table 11: Split-half correlations for ‘financial reporting’ factor structure comparability test

	F1	F2	F3	F4
Four-factor structure	0.9219	0.9788	0.7362	0.1475
Three-factor structure	0.9428	0.9746	0.9205	

Table 11 indicates that factor analysis of the ‘financial reporting’ concept is reliable for a three-factor structure - the split-half correlations for this factor structure exceed the 0.894 threshold for all three factors. For structures with more than three factors, the correlations fall short of the required threshold for one or more factors. In other words, as the number of factors increases, the stability of the structure declines. A six-factor structure may have greater analytical and interpretive potential but may not be as reliable as a three-factor structure. The research implication arising is that comparisons of interpretations of ‘financial reporting’ are likely to be more reliable if they are based on a three-factor structure.

The optimal research outcome is to strike an appropriate balance between instrument reliability and its interpretive capability. The final instrument should therefore comprise those scales that maximise factor coverage without compromising its reliability. Table 12 sets out the 15-scale three-factor structure that achieves this outcome.

Table 12: Stable three-factor analysis of ‘financial reporting’

Correlations between variables and factors	F1	F2	F3	h ²
valuable - worthless	0.796	0.148	-0.033	0.657
beneficial - adverse	0.760	0.339	-0.108	0.704
informative - uninformative	0.749	0.255	-0.066	0.630
powerful - weak	0.691	0.016	0.121	0.492
influential – not influential	0.645	0.160	0.209	0.485
reliable - unreliable	0.184	0.863	-0.082	0.786
honest - dishonest	0.080	0.804	-0.042	0.655
reputable - disreputable	0.074	0.790	0.128	0.646
healthy - sick	0.314	0.716	0.295	0.698
adequate - inadequate	0.255	0.706	0.077	0.570
simple - complex	-0.071	0.046	0.799	0.646
easy - difficult	-0.088	0.147	0.729	0.561
democratic - undemocratic	0.366	0.033	0.601	0.496
flexible - inflexible	0.453	-0.093	0.463	0.428
dynamic - static	0.426	0.293	0.064	0.271
Variability (%)	22.710	22.499	12.954	
Cumulative variability (%)	22.710	45.208	58.162	

The split-half correlations set out in Table 11, which confirm the three-factor reliability of the instrument, are based on the 15 scales and three-factor analysis shown in Table 12. Furthermore, five of the six factors listed in Table 8 are represented by one or more scales in Table 12.

That the analytical and interpretive capability of the three-factor structure is somewhat diminished is evident from the lower cumulative percentage of variance in survey responses explained by the three-factor structure (58.162%) in comparison to the six-factor structure (68.277%). However, while analytical capability is desirable, reliability is a necessity. It is concluded that these 15 scales provide the basis of both a reliable and useful data collection instrument. Accordingly, these scales are included in the finalised instrument for the main research sample.

4.6.1.2 Stable factor structure for the ‘XBRL’ concept

The outcome of split-half correlation testing for the ‘XBRL’ concept is set out in Tables 13 and 14.

Table 13: Split-half correlations for ‘XBRL’ factor structure comparability test

	F1	F2	F3	F4
Four-factor structure	0.6975	0.8902	0.2175	0.7206
Three-factor structure	0.9124	0.8963	0.9063	

Table 13 indicates that the ‘XBRL’ concept is reliably stable for a three-factor structure. The split-half correlations for this structure exceed the 0.894 threshold for all three factors. For structures with more than three factors, the correlations fall short of the required threshold for one or more factors. Any comparisons of the meaning of ‘XBRL’ expressed by different groups using this instrument are therefore more likely to be reliable if they are based on a three-factor structure.

As is the case for ‘financial reporting’, the data collection instrument should ideally maximise factor coverage without compromising its reliability. Table 14 sets out the 15-scale three-factor structure that achieves this outcome.

Table 14: Stable three-factor analysis of 'XBRL'

Correlations between variables and factors:	F1	F2	F3	h²
helpful - unhelpful	0.816	0.074	0.267	0.742
meaningful - meaningless	0.807	0.170	0.151	0.703
liberating - constraining	0.739	0.087	-0.048	0.556
productivity increasing - productivity decreasing	0.731	0.191	0.054	0.573
strong - weak	0.664	0.100	0.518	0.719
simple - complex	-0.012	0.825	-0.043	0.683
easy - difficult	0.007	0.793	0.071	0.633
clear - obscure	0.241	0.720	0.177	0.608
usable - cumbersome	0.312	0.689	0.173	0.602
efficient - inefficient	0.493	0.556	0.234	0.607
believing - sceptical	0.016	0.094	0.787	0.628
available - unavailable	-0.043	0.247	0.686	0.533
successful - unsuccessful	0.184	0.268	0.670	0.555
powerful - impotent	0.242	-0.140	0.554	0.385
democratising - not democratising	0.454	0.000	0.531	0.488
Variability (%)	23.581	19.069	17.452	
Cumulative variability (%)	23.581	42.649	60.102	

The split-half correlations set out in Table 13, which confirm the three-factor reliability of the instrument, are based on the 15 scales and three-factor analysis shown in Table 14. Five of the six factors listed in Table 9 are represented by one or more scales in Table 14.

The discriminatory capability of the three-factor structure (60.102%) is reduced in comparison to a six-factor structure (65.98%) in order to increase instrument reliability. It is concluded that these 15 scales provide the basis of both a reliable and useful data collection instrument. Accordingly, these 15 scales are included in the finalised instrument for the main research sample.

4.6.1.3 Stable factor structure for the ‘democratisation’ concept

The outcome of split-half correlation testing for the ‘democratisation’ concept is set out in Tables 15 and 16.

Table 15: Split-half correlations for ‘democratisation’ factor structure comparability test

	F1	F2	F3	F4
Four-factor structure	0.8577	0.7801	0.6529	0.1066
Three-factor structure	0.9645	0.8227	0.5435	
Two-factor structure	0.9679	0.9041		

Table 15 indicates that the ‘democratisation’ concept is reliably stable for a two-factor structure. For structures with more than two factors, the correlations fall short of the required threshold for one or more factors. Any comparisons of the meaning of ‘democratisation’ expressed by different groups using this instrument are therefore more likely to be reliable if they are based on a two-factor structure.

As is the case for the ‘financial reporting’ and ‘XBRL’ concepts, the semantic differential instrument should maximise factor coverage without compromising its reliability. Table 16 sets out the 15-scale two-factor structure that achieves this outcome.

Table 16: Stable two-factor analysis of ‘democratisation’

Correlations between variables and factors:	F1	F2	h²
good - bad	0.833	0.111	0.707
positive - negative	0.825	0.130	0.698
successful - unsuccessful	0.731	0.243	0.594
meaningful - meaningless	0.721	0.194	0.557
active - passive	0.718	0.238	0.572
strong - weak	0.687	0.340	0.587
vibrant - still	0.649	-0.035	0.422
complete - incomplete	0.072	0.817	0.672
whole - partial	0.147	0.761	0.601
timely - untimely	0.117	0.643	0.427
certain - uncertain	0.137	0.601	0.380
society - individual	0.212	0.520	0.315
formed - formless	0.159	0.467	0.243
real - imaginary	0.491	0.374	0.382
visible - invisible	0.391	0.147	0.174
Variability (%)	29.081	19.806	
Cumulative variability (%)	29.081	48.887	

The split-half correlations set out in Table 15, which confirm the two-factor reliability of the instrument, are based on the 15 scales and two-factor analysis shown in Table 16. Five of the six factors listed in Table 10 are represented by one or more scales in Table 16.

The discriminatory capability of the two-factor structure (48.887%) is reduced in comparison to a seven-factor structure (72.10%) in order to ensure instrument reliability. It is concluded that these 15 scales provide the basis of both a reliable and useful data collection instrument. Accordingly, these 15 scales are included in the finalised instrument for the main research sample.

4.6.2 Reliability of survey respondents

Respondent reliability is a matter of whether a respondent provides consistent answers in respect of similar scales. To test the internal consistency of a subject's responses is to compare responses to effectively synonymous scales at a given time (Dorsten & Hotchkiss 2005, p.79). This is typically achieved with semantic differential scales by random reversal of adjective pairs (Grove & Savich, 1979). For example, a 'good-bad' scale is treated as effectively synonymous with 'inferior-superior' but the synonyms are placed at opposing ends of the respective scales. A high correlational measure across the relevant scales indicates that a subject's responses are reliable. In such a circumstance, it is possible to conclude that an individual respondent has not returned an unconsidered response set⁵⁷.

Tables 5, 6 and 7 list the 25 scales identified on an *a priori* basis for consideration for this thesis. The 'justification' column in each table explains the basis of the inclusion of each scale and, in three cases in each table, a scale is included on the basis that it is synonymous with another scale. The scales regarded as synonymous are reproduced in Table 17.

⁵⁷A response set is the tendency for a subject to select the same answer to many questions in a row regardless of the content of the question or the internal consistency of the answers (Dorsten & Hotchkiss 2005, p.195).

Table 17: Synonymous scale correlations

Concept	Scale	Synonymous scale	Correlation of average ratings
Financial reporting	good -bad strong-weak easy -difficult	beneficial -adverse powerful -weak simple-complex	0.9974
XBRL	good -bad strong-weak easy -difficult	superior -inferior powerful -impotent simple-complex	0.9523
Democratisation	good -bad strong-weak active -passive	positive-negative vigorous-feeble vibrant-still	0.9876
All three concepts			0.9590

The correlation of average ratings compares the average scale ratings⁵⁸ for three given scales with the average scores for their corresponding synonymous scales. The high correlations between sets of synonymous scales indicate that responses to the pilot survey were, overall, internally consistent. The same correlation calculation was performed for each of the 72 individual respondents in order to identify response inconsistencies. Negative or low positive correlations between sets of synonymous scales for any concept prompted a review of the original completed survey to confirm the accuracy of the data input and to check visually for general indications of a response set. Respondents were deemed unreliable if there was persuasive visual evidence in the completed survey of a response set or the overall correlation between each set of nine synonymous scales was negative. One pilot respondent was excluded.

4.6.3 Validity considerations

Data may be reliable but this does not automatically mean that it is valid or, in other words, fit for the purpose for which it is collected (Beins 2004, p.107). An assessment of the validity of a measuring instrument should be ideally by comparison to some

⁵⁸Seventy-two pilot respondents.

independent criteria of measurement. However, in circumstances where there is no way to know for sure how accurate a measurement instrument is, validity must be evaluated indirectly (Beins 2004, p.77). This is the case for semantic differential instruments because there are no commonly accepted criteria of connotative meaning against which any given semantic differential tool can be calibrated (Osgood, et al., 1957, p.140). Three forms of evaluating validity indirectly are (i) construct validity, (ii) content validity and (iii) criterion validity (Dorsten & Hotchkiss 2005, p.76; Grove & Savich, 1979).

4.6.3.1 Content validity

Content validity is an evaluation based on researcher judgement. In the context of this thesis, content validity refers to whether, in the judgement of the researcher, the semantic scales reflect the domains of financial reporting, XBRL and democratisation given the objectives of the thesis. Content validity is also assessed by reference to whether the outcomes correspond with common sense (Dorsten & Hotchkiss 2005, p.77; Osgood, et al., 1957, p.141).

In the case of the ‘financial reporting’ concept, the question is whether the six factors presented in Table 8 may be reasonably argued to capture the significant dimensions of the meaning of ‘financial reporting’. The required conclusion is that there are no significant interpretive components of ‘financial reporting’ omitted from Table 8.

The same content validity considerations apply to the ‘XBRL’ and ‘democratisation’ concepts. The original six- and seven-factor structures in Tables 9 and 10 respectively should correspond to what would be expected to be the respective descriptive attributes

of ‘XBRL’ and ‘democratisation’. Given the contestable meaning of the concept of ‘democracy’ and the fact that democracy would not necessarily be the subject matter expertise of survey respondents, it is no surprise that there would be a greater number of significant dimensions attributable to ‘democratisation’.

Table 18 sets out the researcher’s interpretation of the six- and seven-factor structures derived for each of the concepts.

Table 18: Interpretation of significant factors for each concept

	Financial reporting	XBRL	Democratisation
Number of significant factors	6	6	7
<i>Interpretation:</i>			
<i>First factor</i>	integrity	utility	dynamism
<i>Second factor</i>	utility	success	completeness
<i>Third factor</i>	influence	usability	positivity
<i>Fourth factor</i>	objectivity	availability	security
<i>Fifth factor</i>	complexity	justifiability	tangibility
<i>Sixth factor</i>	transparency	potency	maturity
<i>Seventh factor</i>			visibility

It is acknowledged that attributing labels to factors is ultimately a matter of subjective interpretation. Other researchers could interpret Tables 8, 9 and 10 differently and conclude that alternative labels are more accurate. The labels in Table 18 are argued to be appropriate on the basis that they are representative of the scales that correlate strongly with the corresponding factors.

The labels listed in Table 18 are the basis upon which different interpretations of concepts are expressed. For example, if respondents differ in terms of an interpretation of ‘XBRL’, Table 18 suggests that the difference is most likely to be expressed in terms of its utility, success and usability. Similarly, respondents who have the same interpretation of ‘financial reporting’ are likely to agree in terms of its integrity, utility

and influence. Interpretations of ‘democratisation’ may be expressed in terms of dynamism, completeness and positivity. It is argued, therefore, that the approach used to identify and select 25 scales and subsequent pilot testing is effective in terms of constructing a valid framework within which survey respondents can express comprehensive connotative interpretations of ‘financial reporting’, ‘XBRL’ and ‘democratisation’. This approach results in the identification of significant discriminatory factors for each of the concepts that are consistent with what would be commonly expected.

In the case of ‘financial reporting’, five of these six factors listed in Table 18 are represented in the finalised 15-scale instrument (Table 12). Similarly, five of the six ‘XBRL’ factors in Table 18 are represented in the finalised 15-scale instrument (Table 14) and six of the seven ‘democratisation’ factors in Table 18 are represented in the finalised 15-scale instrument (Table 16). It is concluded that the validity of the instrument is not diminished by the reduction in the number of scales for each concept.

4.6.3.2 Construct validity

Construct validity is a check on whether the instrument behaves as predicted by theory. Semantic differential theory suggests that connotative interpretations of concepts are multi-dimensional structures, the three most significant of which were labelled by Osgood, et al., (1957) as ‘evaluative’, ‘potency’ and ‘activity’ (‘EPA’). Repeated use of semantic differential instruments across numerous subject domains has reproduced multi-dimensional structures of an equivalent EPA-type. When using the semantic differential, there should therefore be a reasonable expectation of obtaining a multi-dimensional factor structure and, in obtaining that structure, concluding positively on

the construct validity of the instrument. In other words, *‘if a theory predicts how constructs relate to each other, and validity is inferred from such a related network of relationships, this validates both the measure and the theory behind it’* (Oppenheim, 1992).

In the case of each of the three concepts, the semantic differential instruments utilised in the pilot study returns multi-dimensional semantic structures. Table 19 summarises, by concept, the cumulative variance attributable to the first and second three factors.

Table 19: Summary of factor information (by concept)

	Financial reporting	XBRL	Democratisation
Number of significant factors	6	6	7
Cumulative variance attributable to the first three factors	43.99%	42.51%	41.80%
Cumulative variance attributable to the second three factors	24.29%	23.49%	23.29%

For each concept, the cumulative variance attributable to the first three factors is substantially greater than the cumulative variance attributable to the second three factors. This predominance of a three-factor structure is consistent with Osgood, et al.,’s (1957, p.72) findings.

The percentage of cumulative variance explained by the first three factors is also consistent with Osgood, et al.,’s initial research (1957, p.38): *‘...it nevertheless should be noted that 50 per cent of the total variance does remain unexplained.’*, and compares favourably with accounting studies⁵⁹. The construct validity of the instrument for use in

⁵⁹A three-factor structure of an interpretation of ‘true and fair’ based on 22 scales accounted for between 47.1% and 49.5% of variance (depending on category of respondent) for Houghton (1987). Oliver’s (1974) three-factor interpretations of ‘accounting’ and ‘income determination’ accounted for 61% and 64% of variance although this was based on ten scales, which would have reduced the potential for

this thesis is therefore supported by the fact that, for each concept, it generates multi-dimensional structures that are consistent with expectations of a predominant three-factor structure.

Whereas the construct validity of the instrument is supported by the number of predominant factors, some comfort that the nature of each of the factors is consistent with semantic differential theory is also required. For the ‘financial reporting’ concept, the ‘integrity’, ‘utility’ and ‘influence’ in Table 18 are proposed as the contextual equivalent to Osgood, et al.,’s (1957) ‘evaluative’, ‘potency’ and ‘activity’ labels respectively. ‘Integrity’ is characterised by whether financial reporting is, for example, reliable, reputable, honest and transparent, all of which are argued would be included in an ‘evaluation’ of a financial reporting process as a fundamentally good or bad phenomenon. ‘Utility’ captures whether financial reporting is, for example, beneficial, powerful, informative and valuable – it reflects the potential of financial reporting to make an instrumental difference. The ‘influence’ factor, interpreted as whether financial reporting is actually making a difference, is exemplified by the influential, dynamic and active scales. It is concluded that the nature of the first three factors produced by the instrument is consistent with semantic differential theory.

Regarding the ‘XBRL’ concept, the first three factors are labelled in Table 18 as ‘utility’, ‘success’ and ‘usability’. They are argued to be the substantive equivalents of Osgood, et al.,’s (1957) ‘potency’, ‘evaluative’ and ‘activity’ respectively. ‘Utility’, which accounts for 15.79% of variance and is the single most significant factor, is

variability in comparison to an instrument with a greater number of scales. The first three factors of Haried’s (1972) more detailed study of eighteen concepts related to ‘financial statements’ and based on 33 scales accounted for 30% of the total variance.

exemplified by whether XBRL is helpful, liberating and increases productivity. The 'evaluation' factor, accounting for 13.50% of variance, is characterised by whether XBRL is, for example, successful, progressive and democratising. The 'usability' factor, accounting for 13.22% of variance, is characterised by whether XBRL is, for example, complex, clear, efficient, usable or cumbersome.

No individual factor appears to be dominant in terms of distinguishing different interpretations of XBRL. This is unsurprising given the relative immaturity of the technology and the various ways in which individuals may interact with XBRL. It is not surprising that XBRL would be interpreted by some in terms of its potential as much as whether it is currently successful and progressive. As the technology matures and the number of business implementations increase over time, interpretations may be expressed more significantly in terms of actual rather than potential success. It is concluded that the nature of the three most significant factors for the 'XBRL' concept is consistent with semantic differential theory.

Table 18 lists the three most significant interpretive labels for the 'democratisation' concept as 'dynamism' (15.24% of variance), 'completeness' (13.36% of variance) and 'goodness' (13.20% of variance). As is the case with the 'XBRL' concept, no single factor is obviously dominant. It can be argued that the highest percentage of variance is attributed to the 'dynamism' factor because 'democratisation' is conceptually indicative of change. In the context of XBRL and financial reporting, the likelihood that individuals would respond in terms of whether, and the extent to which, democratic change is occurring is therefore unsurprising.

The second ‘democratisation’ factor is labelled as ‘completeness’. It is interpreted to be indicative of the extent to which a process of democratisation is complete. In the context of XBRL and financial reporting, it can be argued that, given that XBRL is an emerging technology, there are likely to be different views on the completeness of the process of democratisation. Furthermore, completeness suggests that the potential benefits of XBRL are being realised.

The third factor, labelled as ‘goodness’, reflects whether ‘democratisation’ is, for example, good, positive and liberating. All pilot survey respondents live in democratic societies and, on this basis, it could be reasonably assumed that differences in interpretations of ‘democratisation’ would not predominantly hinge on whether they regard the underlying concept of democracy to be a good or bad idea. It is evidently still a significant factor but would not be expected to be a dominant ‘evaluative’ factor.

It is concluded that the nature of each of the three most significant ‘democratisation’ factors is consistent with semantic differential theory. That the three factors are approximately of equal significance is attributed to the contingent meanings of democracy set out in the literature review chapter. It is unsurprising that connotative interpretations of a concept as complex as ‘democratisation’ would include several equally significant factors.

Overall, notwithstanding the geographical spread of pilot survey respondents, the variety of ways in which the respondents interact with XBRL and the fact that few of the respondents would consider themselves to be ‘democracy’ domain experts, the semantic differential instrument generated factor structures that are regarded as consistent with the EPA-type structure identified by Osgood, et al., (1957) and semantic

differential studies generally. As the interpretation of factor structures based on semantic differential tools is, by definition, a subjective exercise, it is acknowledged that alternative interpretations are possible. Overall, it is concluded that the survey instrument used to collect data for each concept behaves as would be anticipated by semantic differential theory.

The third aspect of construct validity considered in this thesis is the discriminant validity of the instrument. Discriminant validity provides confirmation that the scales significantly associated with one factor are not significantly associated with any other factor in the proposed factor structure. According to Farrell (2010), discriminant validity is assessed by comparing the average variance extracted (AVE) for a given factor with the shared variance between that factor and every other factor in the structure. If the AVE for a given factor exceeds its shared variance with each of the other factors, then the discriminant validity of the construct is supported.

For a given factor (A), its AVE is the average of the sum of the squares of the correlations for the scales that are significantly associated with A. As the square of a correlation is a calculation of variance, the resultant AVE is the average amount of variance in scale ratings that factor A is able to explain. The AVE is compared with the variance in scale ratings that is shared by two factors. For two factors (A and B), the shared variance is the amount of variance in A's scale ratings that is explained by B and the amount of variance in B's scale ratings that is explained by A. Shared variance is calculated by summing the squares of correlations between (i) A's scales and B, and (ii) B's scales and A. The objective of comparing AVE and shared variance is to confirm that factor A explains more of the variance in the scales that are associated with A than

does factor B (or any other factor in the structure). In order to conclude positively the discriminatory validity of a multi-factorial construct, the AVE for each factor should exceed 0.5 (Fornell & Larcker, 1981). Furthermore, for two given factors A and B, the AVEs of both A and B should be greater than the variance shared by A and B (Farrell, 2010).

AVE and shared variance for each of ‘financial reporting’, ‘XBRL’ and ‘democratisation’ are presented in Tables 20, 21 and 22.

Table 20: AVE and shared variance for ‘financial reporting’ three-factor structure

	F1	F2	F3
F1	0.533		
F2	0.437	0.606	
F3	0.222	0.143	0.510

Table 21: AVE and shared variance for ‘XBRL’ three-factor structure

	F1	F2	F3
F1	0.567		
F2	0.487	0.522	
F3	0.404	0.264	0.513

Table 22: AVE and shared variance for ‘democratisation’ two-factor structure

	F1	F2
F1	0.548	
F2	0.404	0.505

Based on the stable three-factor structure presented in Tables 12, 14 and 16, the AVE for each factor is highlighted in red. The other values represent the shared variances. The AVE for each factor exceeds 0.50 and the AVEs are greater than shared variances in all cases.

The construct validity of the instrument is therefore accepted for the purpose of its application to the main sample of survey respondents.

4.6.3.3 Criterion validity

Criterion validity assesses the predictive capability of instrument variables (Dorsten & Hotchkiss 2005, p.78). The prediction of behaviour is not within the scope of this thesis. This thesis captures differences in beliefs and differences in underlying connotative interpretations but makes no inferences regarding any future behaviour that may result from having those beliefs. There are no conclusions regarding the future behaviour of the research sample.

4.7 Procedures for data collection from main research sample

The finalised survey instrument was deployed during the period from 10 June 2009 to 6 July 2009. It comprised (i) a Likert scale requesting respondents to indicate the extent to which they agree with the substantive assertion that ‘XBRL democratises financial reporting’⁶⁰, (ii) a set of semantic differential scales for each of the ‘financial reporting’, ‘XBRL’ and ‘democratisation’ concepts, and (iii) a number of questions that capture categorical attributes of respondents. The finalised survey instrument is included as Appendix 6 to this thesis.

The survey instrument was accompanied by a covering email (Appendix 1). Two subsequent email reminders were sent at weekly intervals to encourage respondent participation (Appendices 2 and 3). As the survey was completed online, the researcher was automatically notified by email of each instance of a completed survey. Each

⁶⁰Agreement or disagreement with the ‘XBRL democratises financial reporting’ substantive assertion is equivalent to responding to the ‘Does XBRL democratise financial reporting?’ research question.

respondent's data was input to a spreadsheet data file to undertake factor analysis and descriptive statistics analysis using the XLSTAT MS Excel application add-in.

4.8 Conclusions

The research question asks whether XBRL democratises financial reporting. However, the investigation of whether financial reporting is democratised goes beyond evaluating responses to the substantive assertion for the reason that the epistemic objectivity of each of 'financial reporting', 'XBRL' and 'democratisation' is not assumed. The possibility that (i) these individual concepts may be interpreted differently and (ii) responses to the substantive assertion may be related to interpretation of the concepts is incorporated into the research design.

The reason for the semantic differential is to facilitate objective comparisons of how the concepts are interpreted by survey respondents. Participants interpret the substantive assertion concepts by reference to the semantic differential scales associated with each concept and, thereafter, respond to the substantive assertion. Thus, respondents interpret each of the concepts prior to addressing the substantive assertion. This ensures that interpretations of concepts are not conditioned by prior knowledge of the substantive assertion.

Researching an emerging technology such as XBRL and making extensive use of the semantic differential tool for the purpose of interpreting concepts presents significant practical research challenges. In particular, the identification of a suitable sample of survey participants and the identification of appropriate scales for inclusion in the survey instrument require significant consideration. The development of a reliable and

valid survey instrument for presentation to participants who could respond knowledgeably necessitates a substantial pilot study. It is also necessary to strike an appropriate research balance between obtaining rich data and ensuring that the data were fit for purpose.

The outcomes are (i) a list of identified individuals who are assessed to be sufficiently knowledgeable about XBRL and financial reporting in order to respond reliably to the survey instrument and (ii) a survey instrument that is, based on pilot testing, concluded to be sufficiently reliable and valid for the purpose of its deployment to the main research sample.

The research findings and analysis are presented in Chapter Five.

Chapter Five: Findings and Analysis

5.1 Introduction

The objectives of this chapter are to analyse the data using appropriate techniques, to document the significant findings and to conclude on the research question. A summary of responses to the substantive assertion is presented. Respondent interpretations of each of the concepts included in the substantive assertion are constructed and respondents are categorised based on their interpretations⁶¹. The validity of the constructed interpretive frameworks is reviewed.

With reference to the main objectives of the thesis, whether responses to the substantive assertion are related to interpretations of concepts is determined based on the respondent categorisations. The possibility of significant relationships between responses to the substantive assertion and other categorical variables such as location, gender, age or experience is also investigated. Further to these determinations, the chapter concludes on whether the substantive assertion may be regarded as an epistemically objective institutional fact.

The main conclusions arising from the analysis and findings are that a majority of survey respondents profess to ‘agree strongly’ or ‘agree’ that ‘XBRL democratises financial reporting’. In addition, stable interpretive frameworks can be generated for each concept included in the substantive assertion for ‘all’ respondents. These findings

⁶¹References to ‘respondent groups’ throughout this chapter refer to the categorisation of survey participants based on responses to the substantive assertion. The categories are ‘agree strongly’, ‘agree’, ‘neither agree nor disagree’, ‘disagree strongly or disagree’.

support an argument that the substantive assertion is epistemically objective and that 'XBRL democratises financial reporting' constitutes a new institutional fact.

However, when survey respondents are categorised according to responses to the substantive assertion, statistically significant relationships between interpretations of concepts and responses to the substantive assertion emerge. Thus, responses to the substantive assertion are related to how concepts are interpreted. Interpretations of concepts are therefore insufficiently shared by respondents across respondent groups. Furthermore, the stability of the interpretations of concepts for each respondent group falls short of the statistical threshold required to conclude that within-group interpretive frameworks are stable. Thus, there is insufficient support to assert that each respondent group's interpretations of concepts are stable. These findings indicate that when interpretations of the concepts are compared within and between respondent groups, significant differences emerge. Although statistical correlations within and between respondent groups exceed 0.50 in the majority of cases, the threshold required in this thesis to conclude epistemic objectivity is 0.894. Based on this threshold, each of the concepts must be concluded to be epistemically subjective. The substantive assertion that 'XBRL democratises financial reporting' is also concluded to be epistemically subjective. Accordingly, the substantive assertion, at a detailed level of analysis, does not constitute a new institutional fact.

Also of interest is the fact that categorising respondents based on their interpretations of concepts results in the identification of more statistically significant relationships than any other categorical variables included in the survey. Moreover, although many survey participants respond positively or negatively to the inclusion of the verb 'democratises'

in the substantive assertion, the communality coefficients for the '*democratic-undemocratic*' and '*democratising-not democratising*' scales included in the survey instrument for the 'financial reporting' and 'XBRL' concepts respectively are among the lowest. Participants appear to respond to the rhetoric of democratisation but do not interpret the concepts in terms of democracy or democratisation.

The remainder of this chapter is structured to present an overview of participant responses in section 5.2. Interpretive frameworks for each concept included in the substantive assertion are derived in section 5.3. The existence of significant relationships between interpretations of concepts and responses to the substantive assertion is investigated in sections 5.4 and 5.5. Section 5.6 examines the validity of the approaches taken in sections 5.4 and 5.5. The possibility of significant relationships between responses to the substantive assertion and other categorical variables is investigated in Section 5.7. Section 5.8 presents the conclusions arising from the analysis and discussion.

5.2 Overview of responses to the survey

5.2.1 Response rate

A summary of responses to the survey is presented in Table 23.

Table 23: Outcome of the request to participate in the survey

	Count	%
Email requests	448	
Notification of invalid email addresses	(38)	
Requests assumed to have reached addressee	410	100.00%
Respondents who declined to participate	(14)	(3.41)%
Non-respondents	(135)	(32.93)%
Survey respondents	261	63.66%
Responses considered invalid	(9)	(2.20)%
Late responses	(3)	(0.73)%
Responses included in analysis	249	60.73%

Regarding notification of invalid email addresses, emails that do not reach the intended addressee mail account are ‘bounced’ back to the sender. The sender is thereby notified that the email address is invalid.

A number of individuals declined to participate on the basis that they have only a software development orientation. They did not therefore regard themselves as sufficiently competent to express interpretations of the ‘financial reporting’ and/or ‘democratisation’ concepts. A small number of others declined on the basis that they did not understand what was required of them in the survey. It appears they had expected the survey to constitute direct explicit questions about XBRL technology rather than be presented with a survey designed as a semantic differential tool. A decline rate of less than 4% due to either insufficient subject matter competence or failure to understand the survey instrument is regarded as acceptable.

In relation to responses considered invalid, the survey includes eight pairs of scales that are regarded as approximate synonyms. For example, ‘*easy–difficult*’ is similar to ‘*simple–complex*’. It is assumed that survey respondents should respond consistently to synonymous scales and that there should therefore be a positive correlation between sets of synonymous scales. The eight pairs of scales are split into two groups of synonymous scales. A between-groups correlation is calculated for each survey respondent based on the respondent’s ratings on the sixteen relevant scales. Respondents with a negative between-group correlation score were excluded from further analysis. Whereas respondents may legitimately rate a low number of synonymous scales somewhat differently, a negative correlation based on eight pairs of scales is regarded as an indication that a respondent did not demonstrate a sufficiently consistent understanding of the concepts or did not pay sufficient attention to completing the survey⁶².

In relation to the exclusion of late responses, the final invitation to participate in the survey was sent on 1 July 2009. Analysis of survey responses commenced on 6 July 2009. Three survey responses were received after the survey close-off date and are therefore excluded from the analysis.

Smith (2003, p.125) observes that ‘*response rates of less than 25% are common in accounting research*’. This is supported by an empirical evaluation of accounting survey research undertaken by Nazari, et al., (2006) in which 22% of surveys were found to have a response rate below 30%. A response rate of 60.73% therefore

⁶²Section 4.6.2 sets out additional details about assessing the reliability of survey respondents.

compares favourably with general survey response rates and provides a solid basis for the analysis that follows.

Non-response bias refers to a situation in which non-respondents to a survey have systematically different views to respondents. As a result, the respondents could not be concluded to be representative of the population (Saunders, et al., 2000, p.157). In general, tests for non-response bias include contacting a sample of non-respondents to determine why they did not participate, comparing categorical characteristics of respondents with those of non-respondents, or comparing the responses of early respondents to late respondents to investigate whether significant differences exist that suggest non-response bias. For the purpose of this thesis, the initial request to participate was followed where necessary with up to two reminders. Because participants confirmed that they had completed the survey in a separate email, it was possible to identify the request to which they responded. Non-response bias is considered by assessing whether there is a statistically significant relationship between responses to the substantive assertion and number of requests sent before participants responded.

The Chi-square outcome is $X^2(6, N=249) = 12.592, p = 0.0679$ ⁶³. It is acknowledged that the p-value is only marginally above the 0.05 threshold. Appendix 31 provides a visual indicator that respondents to the third request were more likely to ‘agree strongly’ or ‘disagree’ with the substantive assertion. However, because the p-value exceeds the 0.05 threshold that is the benchmark for statistical significance in this thesis, the null

⁶³The details of the Chi-square statistical test are included as Appendix 31 to this thesis.

hypothesis of no significant relationship between the number of requests sent to a participant and the participant's response to the substantive assertion cannot be rejected.

5.2.2 Responses to the substantive assertion

An analysis of responses to the substantive assertion that 'XBRL democratises financial reporting' is presented in Table 24.

Table 24: Tabular analysis of responses to the substantive statement

'XBRL democratises financial reporting'	Count	%
Agree strongly	56	22%
Agree	113	45%
Neither agree nor disagree	48	20%
Disagree	23	9%
Disagree strongly	9	4%
Total	249	100%

The first finding of the survey is that 67% of respondents either 'agree' or 'agree strongly' that 'XBRL democratises financial reporting'. Thirteen per cent either 'disagree' or 'disagree strongly' and 20% are neutral. A clear majority of survey respondents profess to agree with the substantive assertion. However, while it is interesting to quantify the extent of *prima facie* agreement that 'XBRL democratises financial reporting', the more interesting consideration, for the purpose of this thesis, is whether interpretations of the concepts that are included in the substantive assertion are shared by survey participants.

At the emergent stage of a new technology, such as XBRL, concepts that are part of its vocabulary may be epistemically subjective. This means that interpretations of XBRL-related concepts may depend upon individual attitudes. Given the ongoing emergence of XBRL, respondents to the substantive assertion may not be necessarily agreeing and

disagreeing about the same phenomena. The appearance of epistemic objectivity that derives from a headline percentage of 67% agreeing that ‘XBRL democratises financial reporting’ may, in fact, be masking a variety of underlying interpretations of ‘XBRL’, ‘financial reporting’ and ‘democratisation’. It is argued that the epistemic objectivity of the democratisation of financial reporting because of XBRL technologies should be accepted as true in the context of Searle’s (1995) institutional reality only when there is sufficient supporting evidence.

The approach taken is to analyse each of the concepts included in the substantive assertion by reference to the semantic differential scales associated with each concept. The underlying assumption is that respondents express their interpretations of the concepts by rating the scales that collectively define each concept⁶⁴. Scale ratings are factor analysed as follows:

- (i) A multi-factorial structure for each concept for ‘all’ respondents is generated. The 15 scales that define each concept are reduced to three underlying factors (two in the case of ‘democratisation’) that are interpreted and labelled.
- (ii) For each interpretive framework, significant relationships between interpretations of each concept and responses to the substantive assertion, if any, are identified. Each respondent’s interpretation of a concept is expressed as a factor score and categorised. Categories of factor scores and categories of responses to the substantive assertion are assessed for statistically significant relationships.

⁶⁴Recall from section 3.6 that the seven intervals on each scale correspond to ratings from one to seven. A rating of ‘one’ corresponds to a respondent selection at the extreme ‘negative’ end of the scale and a rating of ‘seven’ corresponds to the extreme ‘positive’ end of the scale. Ratings from ‘two’ to ‘six’ correspond to the intervals points between the extremes.

(iii) Step (ii) assumes that the multi-factorial interpretive framework for each concept derived for ‘all’ respondents in step (i) is representative of the interpretive framework for each of the constituent respondent groups. The validity of this assumption is examined by deriving multi-factorial interpretive frameworks for each respondent group and correlating them with each other to determine the extent to which they are homogeneous. Whereas homogeneity of interpretive frameworks is indicative of epistemic objectivity, the absence of such homogeneity suggests epistemic subjectivity.

Each of the ‘XBRL’, ‘financial reporting’ and ‘democratisation’ concepts is interpreted in turn in the sections that follow.

5.3 Interpretive framework for each concept

Multi-factor analyses of ‘XBRL’, ‘financial reporting’ and ‘democratisation’ are presented in Tables 25, 26 and 27 respectively. Three-factor interpretive structures are regarded as appropriate for the ‘XBRL’ and ‘financial reporting’ concepts on the basis that (i) three-factor structures return stable interpretations of these concepts, (ii) the pilot study returns stable three-factor interpretations, and (iii) semantic differential studies in general have demonstrated that the first three factors are likely to be sufficient for reliable and useful interpretations. In the case of the ‘democratisation’ concept, a two-factor structure is regarded as appropriate because (i) a three-factor structure is insufficiently stable, and (ii) the pilot study returns a stable two-factor interpretation of ‘democratisation’.

5.3.1 ‘XBRL’ interpretive framework for ‘all’ respondents

Table 25 sets out the results of the factor analysis process whereby 15 variables, in the form of 15 individual scales, are reduced to three underlying factors. The percentage of variability in scale responses captured by the three underlying factors is 59.992%. Correlations of 0.50 or higher are highlighted.

Table 25: Three-factor analysis of ‘XBRL’ concept for all (249) survey respondents

Correlations between scales and factors	F1	F2	F3	h ²
helpful-unhelpful	0.744	0.081	0.375	0.700
productivity increasing-productivity decreasing	0.713	0.168	0.140	0.556
powerful-impotent	0.688	0.001	0.277	0.550
democratising-not democratising	0.683	0.098	0.021	0.476
liberating-constraining	0.661	0.320	-0.155	0.564
strong-weak	0.651	0.033	0.398	0.583
efficient-inefficient	0.637	0.363	0.166	0.565
meaningful-meaningless	0.629	0.097	0.408	0.571
believing-sceptical	0.582	0.110	0.414	0.522
simple-complex	0.021	0.822	0.030	0.678
easy-difficult	0.161	0.817	0.057	0.697
clear-obscurer	0.196	0.608	0.427	0.590
usable-cumbersome	0.284	0.587	0.458	0.635
available-unavailable	0.079	0.139	0.773	0.622
successful-unsuccessful	0.363	0.151	0.731	0.689
Variability explained (%)	28.569	16.007	15.415	
Cumulative variability (%)	28.569	44.577	59.992	
Split-half correlations for ‘XBRL’	F1	F2	F3	
Three-factor structure	0.9854	0.9753	0.9110	

The first, and most significant factor, captures 28.569% of the variability in scale responses. A review of the higher correlating scales suggests that an appropriate label for the first factor is ‘utility’. Thus, where respondents agree or differ in their interpretations of ‘XBRL, it is reasonably likely that the ‘utility’ of XBRL is a significant explanatory factor.

The second factor captures 16.007% of variability in scale responses. The most significant scales that contribute to this factor are '*simple-complex*' and '*easy-difficult*'. This factor may therefore be labelled in terms of the 'usability' of XBRL. The third factor captures 15.415% of the variability in scale responses. This factor is most significantly characterised in terms of the availability and success of XBRL. It appears that the success of XBRL is currently interpreted in terms of its 'availability'. The '*usable-cumbersome*' and '*clear-obscure*' scales also correlate reasonably highly with this factor. This suggests that respondents consider the clarity and usability of XBRL when evaluating its availability and success.

The three most significant dimensions of the interpretation of XBRL, which retain 59.992% of the variability in scale ratings, are labelled as 'utility', 'usability' and 'availability'. As might be expected for an emerging technology, and consistent with the outcomes of technology acceptance studies, the usefulness and usability of XBRL are significant themes.

The h^2 column in Table 25 lists the communality coefficients for each scale. XBRL is perceived most significantly in terms of its helpfulness, complexity, obscurity, usability, availability and success. All the communality coefficients for scales that correlate highly with the second and third factors are in excess of 59%. All communality coefficients that correlate highly with the first factor are in excess of 50% with the exception of the '*democratising-not democratising*' scale (47.6%). It appears that, relative to other adjectives, respondents do not particularly interpret 'XBRL' in terms of it being democratising.

That 59.992% of variability is incorporated in the three identified factors means that 40.008% of response variability is addressed by up to 12 other factors⁶⁵. However, the eigenvalues of the remaining factors are all less than one. On this basis, none of the remaining factors appears to be individually significant.

The reliability and internal stability of the three-factor interpretation of 'XBRL' is evident from the results of the split-half correlation testing. Correlations between the factor scores of the two half-groups for each 'XBRL' factor are presented at the bottom of Table 25. As the correlations exceed 0.894, a conclusion that the factors are effectively the same as each other is supported statistically. It may be concluded that the three-factor interpretation of 'XBRL', for 'all' respondents, is internally stable and reliable.

5.3.2 'Financial reporting' interpretive framework for 'all' respondents

Table 26 sets out the results of the same factor analysis process for the 'financial reporting' concept. The percentage of variability in scale responses that is captured by three underlying factors is 49.886%.

⁶⁵The maximum number of factors cannot exceed the total number of scales included in the semantic differential instrument.

Table 26: Three-factor analysis of ‘financial reporting’ concept for all (249) survey respondents

Correlations between scales and factors	F1	F2	F3	h²
reliable-unreliable	0.727	0.046	0.129	0.547
reputable-disreputable	0.727	0.019	-0.010	0.529
honest-dishonest	0.725	-0.015	-0.086	0.533
adequate-inadequate	0.724	0.080	0.135	0.549
healthy-unhealthy	0.622	0.238	-0.067	0.448
beneficial-pointless	0.541	0.228	-0.303	0.437
informative-uninformative	0.532	0.208	-0.029	0.327
flexible-inflexible	-0.062	0.809	0.035	0.660
dynamic-static	0.191	0.760	0.086	0.622
simple-complex	0.115	0.056	0.798	0.653
easy-difficult	0.089	0.215	0.716	0.567
democratic–undemocratic	0.382	0.399	0.016	0.305
powerful–impotent	0.452	0.318	-0.362	0.437
valuable–worthless	0.462	0.340	-0.392	0.482
influential-not influential	0.277	0.341	-0.442	0.388
Variability explained (%)	25.135	12.902	11.849	
Cumulative variability (%)	25.135	38.037	49.886	
Split-half correlations for ‘financial reporting’	F1	F2	F3	
Three-factor structure	0.9307	0.9131	0.8794	

A review of the higher correlating scales suggests that an appropriate label for the first factor is ‘integrity’. Thus, where respondents agree or differ in their interpretations of ‘financial reporting’, there is a reasonable likelihood that the ‘integrity’ of financial reporting is a significant reason for agreement or disagreement.

The second and third factors are somewhat easier to label because of the relatively few scales that correlate highly with these factors. The percentage of variability in scale responses that is captured by these two factors is 12.902% and 11.849% respectively. The second factor is predominantly influenced by the ‘flexible-inflexible’ and ‘dynamic-static’ scales, which suggests that ‘flexibility’ is an appropriate label for the second factor. The third factor is predominantly influenced by the ‘simple-complex’ and ‘easy-difficult’ scales, which suggests that ‘complexity’ is an accurate label.

The third factor is also characterised by a number of scales for which the factor correlation is negative. For example, the *'influential-not influential'*, *'valuable-worthless'* and *'powerful-impotent'* scales each correlate negatively with the third factor. This is because the possibility of financial reporting being influential, valuable or powerful is interpreted as being inconsistent with it being complex or difficult.

The communality coefficients in Table 26 range from 30.5% (*'democratic-undemocratic'*) to 66% (*'flexible-inflexible'*). 'Financial reporting' appears to be perceived most significantly in terms of adequacy, flexibility and complexity. For a number of scales, a significant percentage of the response variance is not captured by the three most significant factors. For example, none of the *'democratic-undemocratic'*, *'powerful-impotent'*, *'valuable-worthless'* and *'influential-not influential'* scales record a correlation in excess of 0.50 for any of the first three factors nor do they correlate significantly with any of the other factors⁶⁶. It is therefore arguable that 'financial reporting' is not perceived in terms of these adjectives to any significant extent.

The reliability and internal stability of the factor analysis of 'financial reporting' is evident from the results of the split-half correlation test undertaken for this three-factor structure. The split-half correlation for the third factor, at 0.8794 falls marginally short of the 0.894 threshold, which suggests that three factors is the maximum number of factors for which the structure would remain stable.

⁶⁶This may be concluded because, if this scale did correlate highly with any factor, the eigenvalue for that factor would be significant. With particular regard to the *'democratic-undemocratic'* scale, none of the eigenvalues for any of the other factors is significant.

The variability in scale ratings captured by these three factors is 49.886%, which means that 50.114% of the variability is captured by up to twelve other factors. The eigenvalues for the remaining factors were reviewed for the values greater than one. The fourth and fifth factors have eigenvalues of 1.069 and 1.022 respectively. On the one hand, the inclusion of the fourth and fifth factor would increase the percentage of scale variability explained to 63.829%. However, split-half correlation testing for the fourth and fifth factors returned values below 0.894 on both factors, which indicates that a five-factor structural interpretation of 'financial reporting' is insufficiently stable. Appendix 7 to this thesis presents the five-factor analysis of the 'financial reporting' concept.

The five-factor analysis of the 'financial reporting' concept illustrates the trade-off between the variability in scale responses captured by a factorial structure and the number of factors that can be reliably included in the structure. The inclusion of a greater number of factors is desirable on the basis that it increases the percentage of variability explained by the factorial structure. However, the stability of the structure (as measured by split-half reliability testing) diminishes as the number of factors increases. Notwithstanding the identification of a fourth and fifth factor for 'financial reporting' for which the eigenvalues exceed a value of 'one', a factorial structure that includes more than three factors become insufficiently reliable for the purpose of further analysis. The number of reliable factors is concluded to be three: 'integrity', 'flexibility' and 'complexity'.

5.3.3 ‘Democratisation’ interpretive framework for ‘all’ respondents

Table 27 sets out the results of the factor analysis process for the ‘democratisation’ concept. The percentage of variability in scale responses that is captured by the two underlying factors is 46.332%.

For this concept, ‘all’ respondents number 234 because 15 of the 249 survey respondents selected the mid-point for every ‘democratisation’ scale on the semantic differential instrument. It is assumed that these respondents were either unable or unwilling to express an interpretation of ‘democratisation’.

Table 27: Two-factor analysis of ‘democratisation’ concept for all (234) respondents

Correlations between scales and factors	F1	F2	h²
positive–negative	0.831	0.089	0.699
meaningful–meaningless	0.790	0.073	0.629
good–bad	0.761	-0.006	0.579
strong–weak	0.667	0.351	0.568
vibrant–feeble	0.654	0.122	0.442
real–imaginary	0.641	0.334	0.522
timely–untimely	0.544	0.080	0.303
complete–incomplete	0.070	0.739	0.551
successful–unsuccessful	0.373	0.733	0.677
whole–partial	0.320	0.648	0.522
formed–formless	0.002	0.539	0.290
certain–uncertain	0.497	0.505	0.502
visible–invisible	0.415	0.339	0.287
society–individual	0.015	0.318	0.101
active–passive	0.426	0.309	0.277
Variability explained (%)	28.805	17.527	
Cumulative variability (%)	28.805	46.332	
Split-half correlations for ‘democratisation’	F1	F2	
Two-factor structure	0.9591	0.9522	

The first factor captures 28.805% of the variability in scale responses. A review of the higher correlating scales suggests that an appropriate label for the first factor is

‘positivity’ because it describes the extent to which respondents predominantly regard ‘democratisation’ as a ‘positive’, ‘meaningful’, ‘good’, ‘strong’ and ‘vibrant’ phenomenon. Thus, where respondents agree or differ in their interpretations of ‘democratisation’, there is a reasonable likelihood that their ‘positivity’ towards ‘democratisation’ is a significant reason for agreement or disagreement.

The percentage of variability in scale ratings that is captured by the second factor is 17.527%. The higher correlating scales suggest that an appropriate label for the second factor is ‘completeness’ because it describes the extent to which respondents regard ‘democratisation’ as ‘complete’, ‘successful’, ‘whole’, ‘formed’ and ‘certain’. It appears that respondents interpret ‘democratisation’ in the context of XBRL as a maturing process, currently at a certain stage of development and about which respondents are largely positive. The inclusion of the ‘*successful-unsuccessful*’ as a significant scale for the second factor indicates that success is synonymous with completion. This suggests that respondents associate the success of XBRL with meaningful implementation.

The communality coefficients (h^2) in Table 27 range from 10.1% (‘*society-individual*’) to 69.9% (‘*positive-negative*’). This indicates the percentage of response variance that is (and is not) captured by the two most significant factors. The low communality coefficients for a number of scales indicate that they may not be particularly relevant to an interpretation of ‘democratisation’ within the XBRL community. For example, the ‘*society-individual*’ scale does not have a strong correlation with any of the factors. In other words, the society-individual scale does not appear to have a helpful discriminatory capability.

The internal stability of the two-factor structure is evident from the results of the split-half correlation test presented in Table 27. As the correlations exceed 0.894, a conclusion that the factors are effectively the same as each other is supported statistically. It is concluded that the two-factor interpretation of ‘democratisation’, for ‘all’ respondents, is internally stable and reliable.

A third significant factor has an eigenvalue of 1.133, which suggests that a three-factor structure for ‘democratisation’ could be considered. The inclusion of a third factor increases the percentage of scale rating variability captured by the factors to 53.888%. The three-factor structure is, however, insufficiently stable on the basis that the split-half correlations are less than 0.894 for two of the three factors. The three-factor structure for ‘democratisation’ is included as Appendix 9 to this thesis. The number of factors that provides a reliable basis of further analysis is concluded to be two: ‘positivity’ and ‘completeness’.

A two-factor structure is indicative of a simpler interpretive framework in comparison to ‘XBRL’ and ‘financial reporting’. This is unsurprising given that respondent expertise regarding democracy or democratisation would not be assumed. That respondents would express interpretations of ‘democratisation’ in simpler terms and not distinguish between scales to the same nuanced extent as for ‘XBRL’ and ‘financial reporting’ is reasonable.

5.3.4 Conclusion on the interpretive frameworks

Table 28 summaries the stable interpretive frameworks for each of the concepts included in the substantive assertion.

Table 28: Summary of interpretive framework for each concept

Interpretation:	XBRL	Financial reporting	Democratisation
<i>First factor</i>	utility	integrity	positivity
<i>Second factor</i>	usability	flexibility	completeness
<i>Third factor</i>	availability	complexity	

In the case of ‘XBRL’, its utility is expressed most significantly in terms of its helpfulness, productivity and power. Its usability is expressed most significantly in terms of its clarity and simplicity. Its availability is closely related to perceptions of its success. In contrast, ‘XBRL’ is perceived least in terms of being democratising.

The integrity of ‘financial reporting’ is expressed most significantly in terms of its reliability, reputability and honesty. ‘Financial reporting’ is also interpreted in terms of dynamism and flexibility. Its relative complexity is also a discriminatory factor. In contrast, it is interpreted least in terms of its capacity to inform and being democratic.

Given that the majority of survey participants responded positively to the assertion that ‘XBRL democratises financial reporting’, it is interesting that neither ‘financial reporting’ nor ‘XBRL’ were perceived in terms of being democratic or democratising relative to the other available adjectives. Survey participants expressed interpretations of each of the concepts before being presented with the substantive assertion. It appears that, while the concepts would not be primarily perceived in terms of democracy or democratisation, respondents appear to be nonetheless open to and accepting of such a rhetorical suggestion.

In the case of ‘democratisation’, its positivity is expressed most significantly in terms of its meaningfulness and goodness. Its completeness is expressed most significantly in terms of its success, wholeness, and the extent to which it is fully formed. In contrast,

‘democratisation’ is interpreted least in terms of being underpinned by philosophies of individualism or socialism.

Comparisons with the interpretive frameworks generated during pilot testing reveal a high degree of similarity in terms of the significant adjectival scales and factors⁶⁷. The reliability and usefulness of the survey instrument is supported by the longitudinal consistency of the factor analyses.

The stable factor analyses and interpretations of concepts for ‘all’ respondents provides a reliable basis for locating each individual respondent within the interpretive framework for each concept. Thus, respondents may be grouped and compared by reference to factor scores and scale ratings.

5.4 Tests for significant associations between responses to the substantive assertion and respondent factor scores

The existence of stable interpretive frameworks for each concept supports an initial supposition that each is epistemically objective – when ‘all’ respondents are randomly split into two sub-groups, the factor structures of the sub-groups are very similar to each other. However, in order to assess whether respondents are agreeing and disagreeing about the same phenomena in the context of the substantive assertion, it is necessary to examine the distribution of respondent factor scores within the interpretive frameworks. If respondent factor scores are randomly distributed without reference to responses to the substantive assertion, it may be concluded that respondent interpretations of a

⁶⁷The outcomes of the interpretations of each concept undertaken during pilot testing are presented in Table 18.

concept makes no difference to responses to the substantive assertion. In other words, the concepts may be concluded to be epistemically objective. However, the identification of significant associations would suggest that responses to the substantive assertion are related to interpretations of the concepts.

The calculation of each respondent's factor scores for each concept is explained in section 3.6.2.2. Factor scores map each respondent's interpretation of a concept to a location within that concept's interpretive framework. Section 5.3 presents three-factor interpretive frameworks for 'XBRL' and 'financial reporting', and a two-factor framework for 'democratisation'. As such, locating respondent interpretations by reference to factor scores is akin to positioning them using two- and three-dimensional Cartesian coordinates.

5.4.1 Categorisation of respondent factor scores for each concept

For each concept, the factor scores of 'all' 249 respondents are categorised by factor and according to whether they are greater or less than the median score for each factor.

5.4.1.1 XBRL

Based on factor scores for 'all' respondents, quartile values by factor are presented in Table 29⁶⁸. Quartiles divide a range of observations (factor scores in the case of this thesis) into four sections, each containing one quarter of the observations (Saunders, et al., 2000, p.355).

⁶⁸The three-factor scores for 'all' respondents for the 'XBRL' concept are included as Appendix 8 to this thesis.

Table 29: Quartile analysis of ‘XBRL’ factor scores for ‘all’ respondents

Quartile	Utility	Usability	Availability
1	(0.5897)	(0.7056)	(0.7021)
2	0.1069	(0.0861)	0.0469
3	0.7004	0.6051	0.7161
4	2.4011	2.7581	2.3603

Each respondent is categorised according to whether his/her factor scores are greater or less than the median score (highlighted in red in Table 29). The resultant eight groups are listed in Table 30. Values highlighted in red are above the average for the column and values highlighted in green are below the average.

Table 30: Groupings based on ‘XBRL’ factor scores greater or less than median values

Group	Count of respondents	Response to substantive assertion (average) ⁶⁹	Utility score greater than the median?	Usability score greater than the median?	Availability score greater than the median?
1	31	2.87	no	no	no
2	35	3.60	no	yes	no
3	30	3.57	no	no	yes
4	28	3.50	no	yes	yes
5	29	3.97	yes	no	no
6	29	4.10	yes	yes	no
7	34	4.21	yes	no	yes
8	33	4.06	yes	yes	yes
All	249	3.74			

For example, group 1 includes respondents whose factor scores are less than the median values for all three factors. In contrast, group 8 is comprised of respondents whose factor scores are greater than the median values for all three factors. A visual inspection

⁶⁹Value of five if respondent ‘agrees strongly’ with the substantive assertion, four for ‘agree’ respondents, three for ‘neither agree nor disagree’ respondents, two for ‘disagree’ respondents and one for ‘disagrees strongly’ respondents.

of Table 30 suggests the possibility of a significant relationship between responses to the substantive assertion and utility factor scores⁷⁰.

5.4.1.2 Financial reporting

Based on factor scores for ‘all’ respondents, quartile values by factor are presented in Table 31. The resultant eight groups are listed in Table 32⁷¹.

Table 31: Quartile analysis of ‘financial reporting’ factor scores for all respondents

Quartile	Integrity	Flexibility	Complexity
1	(0.5439)	(0.6510)	(0.7294)
2	0.0456	(0.1650)	(0.0162)
3	0.7096	0.5694	0.7609
4	2.2317	2.9586	1.9959

Table 32: Groupings based on ‘financial reporting’ factor scores greater or less than median values

Group	Count of respondents	Response to substantive assertion (average)	Integrity score greater than the median?	Flexibility score greater than the median?	Complexity score greater than the median?
1	28	3.57	no	no	no
2	33	3.27	no	yes	no
3	33	3.85	no	no	yes
4	30	3.87	no	yes	yes
5	38	3.84	yes	no	no
6	25	3.68	yes	yes	no
7	25	4.00	yes	no	yes
8	37	3.84	yes	yes	yes
All	249	3.74			

The possibility of a significant relationship between responses to the substantive assertion and integrity factor scores is not visually as evident in Table 32 in comparison

⁷⁰Additional descriptive statistics (standard deviation, skewness and average scores for each group) are included as Appendix 10 to this thesis.

⁷¹The three-factor scores for all respondents for the ‘financial reporting’ concept are included as Appendix 12 to this thesis.

to Table 30. However, the visual similarity between responses to the substantive assertion and the complexity factor may be significant⁷².

5.4.1.3 Democratisation

Based on factor scores for ‘all’ respondents, quartile values by factor are presented in Table 33. The resultant four groups are listed in Table 34⁷³.

Table 33: Quartile analysis of ‘democratisation’ factor scores for all (234) respondents

Quartile	Positivity	Completeness
1	(0.6689)	(0.6231)
2	0.0395	0.0512
3	0.7479	0.7234
4	2.0876	2.3065

Table 34: Groupings based on ‘democratisation’ factor scores greater or less than median values

Group	Count of respondents	Response to substantive assertion (average)	Positivity score greater than the median?	Completeness score greater than the median?
1	64	3.31	no	no
2	53	3.91	yes	no
3	53	3.87	no	yes
4	64	4.13	yes	yes
All	234	3.79		

There are only four groups in the case of ‘democratisation’ because of a two- rather than a three-factor interpretive framework. A visual review of Table 34 suggests there may

⁷²Additional descriptive statistics (standard deviation, skewness and average scores for each group) are included as Appendix 11 to this thesis.

⁷³The two-factor scores for ‘all’ respondents for the ‘democratisation’ concept are included as Appendix 13 to this thesis.

be significant relationships between responses to the substantive assertion and one or both of the factors⁷⁴.

5.4.2 Chi-square testing for significant association between responses to the substantive assertion and respondent factor scores

The possibility of significant relationships between factor scores and responses to the substantive assertion is investigated statistically by reference to Chi-square testing of Tables 35, 36 and 37. The Chi-square statistic is a measure of the difference between observed and expected frequencies for each cell in a data table (Dorsten & Hotchkiss 2005, p.284). As such, if there are significant associations between respondents' factor scores and responses to the substantive assertion, the categorised data clusters in ways that are unlikely to occur by chance⁷⁵.

5.4.2.1 XBRL

Table 35 categorises responses to the substantive assertion by reference to the factor score categories derived in Table 30. Values that are greater than the columnar average for all groups are highlighted in red.

⁷⁴Additional descriptive statistics (standard deviation, skewness and average scores for each group) are included as Appendix 14 to this thesis.

⁷⁵ Reliance is primarily placed on non-parametric testing because the variables are non-metric (Smith 2003, p.57). As parametric testing ideally requires normally distributed and measured data, a non-parametric statistical test is more appropriate for the data collected for this thesis. Moreover, parametric statistical tests rely on equal sample sizes, which is not the case in this thesis.

Table 35: Categorisation of responses to substantive assertion by three-factor ‘XBRL’ scores

Group	Disagree strongly or disagree ⁷⁶	Neither agree nor disagree	Agree	Agree strongly	Total
1	35%	35%	29%	0%	100%
2	11%	23%	57%	9%	100%
3	13%	27%	50%	10%	100%
4	11%	39%	39%	11%	100%
5	10%	10%	48%	31%	100%
6	3%	10%	55%	31%	100%
7	6%	6%	47%	41%	100%
8	12%	6%	36%	45%	100%
All	13%	19%	45%	22%	100%

The Chi-square statistic for Table 35 is $X^2(21, N=249) = 68.864, p < 0.0001$. According to the Chi-square statistic, the likelihood of the calculated value (68.864) occurring by chance if the variables are not associated is less than 0.01%. The probability of a type I error (wrongly rejecting the null hypothesis of no significant association between the variables) is very low and, based on this test outcome, the null hypothesis may be rejected.

A relationship between ‘XBRL’ factor scores and responses to the substantive assertion is therefore both visually and statistically evident. ‘Agree strongly’ or ‘agree’ respondents are represented disproportionately high in groups five to eight. In contrast, ‘disagree strongly or disagree’ and ‘neither agree nor disagree’ respondents are disproportionately high represented in group one. This means that survey respondents are not randomly distributed within the three-factor interpretive structure of ‘XBRL’. There is an evident relationship between three-factor interpretations of ‘XBRL’

⁷⁶The ‘disagree strongly’ and ‘disagree’ categories are combined in order to meet minimum table cell requirements for statistical testing (Saunders, et al., 2000, p.358). These categories are combined for the remainder of this chapter.

responses to the substantive assertion. Respondents who agree with the substantive assertion tend to score relatively highly on the utility factor and on at least one of the other factors (indicating that it is usable and/or available). Respondents who disagree or are neutral tend to score relatively lowly on the utility factor and on at least one of the other two factors. This suggests that respondents who disagree or are neutral are, in relative terms, less enthusiastic about the power of XBRL to effect positive change, regard it as a complex technology and/or do not perceive it to be available for implementation.

5.4.2.2 Financial reporting

Table 36 categorises responses to the substantive assertion by reference to the factor score categories derived in Table 32. Values that are greater than the columnar average for all groups are highlighted in red.

Table 36: Categorisation of responses to substantive assertion by three-factor ‘financial reporting’ scores

Group	Disagree strongly or disagree	Neither agree nor disagree	Agree	Agree strongly	Total
1	18%	21%	43%	18%	100%
2	30%	21%	30%	18%	100%
3	9%	24%	36%	30%	100%
4	3%	27%	50%	20%	100%
5	11%	11%	58%	21%	100%
6	12%	20%	52%	16%	100%
7	8%	12%	48%	32%	100%
8	11%	19%	46%	24%	100%
All	13%	19%	45%	22%	100%

The Chi-square statistic for Table 36 is $X^2(21, N=249) = 22.304, p = 0.3822$. Whereas the highlighted values in Table 36 are visually suggestive of an association between group factor scores and responses to the substantive assertion, the visual is not

supported by the Chi-square p value of 0.3822. The spread of percentages above and below the averages for ‘all’ respondents in Table 36 is not as large as in Table 35. Hence, the categorisations are not sufficiently significant to reject the null hypothesis of no significant differences between the groups.

5.4.2.3 Democratisation

Table 37 categorises responses to the substantive assertion by reference to the factor score categories derived in Table 34. Values that are greater than the columnar average for all groups are highlighted in red.

Table 37: Categorisation of responses to substantive assertion by two-factor ‘democratisation’ scores

Group	Disagree strongly or disagree	Neither agree nor disagree	Agree	Agree strongly	Total
1	25%	22%	48%	5%	100%
2	15%	8%	38%	40%	100%
3	4%	19%	64%	13%	100%
4	6%	13%	42%	39%	100%
All	13%	15%	48%	24%	100%

The Chi-square statistic for Table 37 is $X^2(9, N=234) = 46.325, p < 0.0001$. A relationship between factor scores and responses to the substantive assertion is both visually and statistically evident. ‘Agree strongly’ respondents are represented disproportionately highly in groups two and four and ‘disagree strongly’ respondents are represented disproportionately highly in groups one and two.

The relatively high average score for the response to the substantive assertion for group two that is presented in Table 34 (3.91) is explained by the inclusion of 40% of ‘agree strongly’ respondents in group two in Table 37. In combination, ‘agree strongly’ and

‘agree’ respondents are represented more significantly in the second (78%), third (77%) and fourth (81%) groups in comparison to the first group (53%). In contrast, ‘neither agree nor disagree’ and ‘disagree strongly or disagree’ respondents are, in combination, more likely to be in group one (47%) than in group four (19%).

Overall, there are statistically significant relationships between responses to the substantive assertion and multi-factor interpretations of ‘XBRL’ and ‘democratisation’. There is no such evident relationship for ‘financial reporting’. The possibility of significant relationships is further investigated on an individual factor basis.

5.4.3 Chi-square testing for significant associations between responses to the substantive assertion and individual factors

The significance of relationships between factor scores and responses to the substantive assertion are investigated by individual factors in this section. The precise significance of already-identified relationships at multi-factorial level and details thereof may become evident only when the constituent factors are examined individually. Furthermore, some statistically significant relationships may only become apparent when individual factors are examined in isolation.

5.4.3.1 XBRL

Table 38 categorises responses to the substantive assertion according to first factor (utility) quartile values only. The tabular percentages highlighted in red correspond to percentages that are higher than the equivalent columnar percentage for ‘all’ respondents.

Table 38: Categorisation of responses to substantive assertion by ‘XBRL’ utility factor scores

Utility factor groups	Disagree strongly or disagree	Neither agree nor disagree	Agree	Agree strongly	Total
Quartile 1	27%	40%	32%	2%	100%
Quartile 2	8%	21%	58%	13%	100%
Quartile 3	10%	8%	53%	29%	100%
Quartile 4	6%	8%	39%	47%	100%
All	13%	19%	45%	22%	100%

The Chi-square statistic for Table 38 is $X^2(9, N=249) = 73.583$, $p < 0.0001$. A p-value of less than 0.05 indicates a significant relationship between categorical variables. A relationship between utility factor scores and responses to the substantive assertion is visually evident from both Tables 30 and 38, and is statistically supported by Chi-square testing. There is evidently a significant relationship between responses to the substantive assertion and the perceived utility of XBRL.

Table 39 categorises responses to the substantive assertion according to second factor (usability) quartile values only.

Table 39: Categorisation of responses to substantive assertion by ‘XBRL’ usability factor scores

Usability factor groups	Disagree strongly or disagree	Neither agree nor disagree	Agree	Agree strongly	Total
Quartile 1	17%	21%	41%	21%	100%
Quartile 2	15%	18%	47%	21%	100%
Quartile 3	11%	24%	48%	16%	100%
Quartile 4	8%	15%	45%	32%	100%
All	13%	19%	45%	22%	100%

The Chi-square statistic for Table 39 is $X^2(9, N=249) = 8.332$, $p = 0.5011$. In this case, there is no significant relationship between usability factor scores and responses to the

substantive assertion. This outcome suggests that respondent groups' perceptions of the usability of XBRL do not differ significantly from each other.

Table 40 categorises responses to the substantive assertion according to third factor (availability) quartile values only.

Table 40: Categorisation of responses to substantive assertion by 'XBRL' availability factor scores

Availability factor groups	Disagree strongly or disagree	Neither agree nor disagree	Agree	Agree strongly	Total
Quartile 1	14%	24%	44%	17%	100%
Quartile 2	16%	18%	50%	16%	100%
Quartile 3	10%	23%	48%	19%	100%
Quartile 4	11%	13%	39%	37%	100%
All	13%	19%	45%	22%	100%

The Chi-square statistic for Table 40 is $X^2(9, N=249) = 12.640, p = 0.1796$. Visual evidence of a relationship between third factor scores and responses to the substantive assertion is apparent but it is not supported by the outcome of Chi-square testing. The $p=0.1796$ test statistic is insufficiently low to reject the null hypothesis of no significant relationship between the categorical variables. Whether XBRL is available for use does not appear, therefore, to be related to responses to the substantive assertion.

In summary, the most significant individual factor in terms of relating interpretations of XBRL to responses to the substantive assertion is XBRL's perceived utility. In particular, 'agree strongly' respondents are over-represented in the third and fourth quartiles of Table 38. This is evidence of interpretive clustering on the utility factor.

The second and third factors do not relate factor scores to substantive assertion responses to the same degree of significance. The perceived usability and availability of

XBRL are not related to responses to the substantive assertion to a statistically significant degree. It may be inferred that at least some of the ‘agree strongly’ and ‘agree’ respondents acknowledge the complexity of the technology and the still outstanding matters of making it widely available and usable.

5.4.3.2 Financial reporting

Table 41 categorises responses to the substantive assertion according to first factor (integrity) quartile values only.

Table 41: Categorisation of responses to substantive assertion by ‘financial reporting’ integrity factor scores

Integrity factor groups	Disagree strongly or disagree	Neither agree nor disagree	Agree	Agree strongly	Total
Quartile 1	8%	19%	43%	30%	100%
Quartile 2	24%	27%	35%	13%	100%
Quartile 3	16%	11%	55%	18%	100%
Quartile 4	3%	19%	48%	29%	100%
All	13%	19%	45%	22%	100%

The Chi-square statistic for Table 41 is $X^2(9, N=249) = 25.319$, $p = 0.0026$. Thus, responses to the substantive assertion are significantly related to the perceived integrity of financial reporting. With regard to ‘agree strongly’ respondents, higher than average percentages of respondents are located in the first and fourth quartiles. Thus, ‘agree strongly’ respondents rate the integrity of ‘financial reporting’ either comparatively lowly or highly. This suggests that, according to ‘agree strongly’ respondents, XBRL democratises financial reporting because either (i) financial reporting is lacking in integrity, or (ii) XBRL further enhances a system that is solidly underpinned by integrity.

In contrast, ‘disagree strongly or disagree’ respondents are predominantly positioned in the second and third quartiles. This suggests that financial reporting is not particularly underpinned by or lacking in integrity and, regardless, XBRL does not make much difference.

The left-to-right downward diagonal that is evident in Table 38 in relation to ‘XBRL’ is not evident in Table 41 for the ‘financial reporting’ concept. Although there is a significant relationship between ‘financial reporting’ integrity factor scores and responses to the substantive assertion, it is not the linear-type relationship that is evident for ‘XBRL’. Instead, the significance arises most particularly due to concentrations of ‘disagree strongly or disagree’ respondents in the second and third quartiles and ‘agree strongly’ respondents in the first and fourth quartiles. This matter is considered further in section 5.5.2.

Table 42 categorises responses to the substantive assertion according to second factor (flexibility) quartile values only.

Table 42: Categorisation of responses to substantive assertion by ‘financial reporting’ flexibility factor scores

Flexibility factor groups	Disagree strongly or disagree	Neither agree nor disagree	Agree	Agree strongly	Total
Quartile 1	11%	16%	46%	27%	100%
Quartile 2	13%	18%	47%	23%	100%
Quartile 3	16%	21%	37%	26%	100%
Quartile 4	11%	23%	52%	15%	100%
All	13%	19%	45%	22%	100%

The Chi-square statistic for Table 42 is $X^2(9, N=249) = 5.805$, $p = 0.7593$. A p-value of 0.7593 indicates that there is no significant relationship between the flexibility of financial reporting and responses to the substantive assertion. Most percentage values

in Table 42 approximate the corresponding columnar percentage for ‘all’ respondents. It is visually notable, however, that an above average percentage of the factor scores of ‘agree strongly’ respondents fall into the first quartile category. This indicates that a number of ‘agree strongly’ respondents scored the flexibility of ‘financial reporting’ comparatively lowly on the second factor. Moreover, only 15% of factor scores in the fourth quartile relate to ‘agree strongly’ respondents. Also noteworthy, even if not statistically significant, is the relative concentration of ‘disagree strongly or disagree’ respondents in the second and third quartiles. Thus, the perceived flexibility of financial reporting, or absence thereof, is not significant in terms of agreement or disagreement with the substantive assertion.

Table 43 categorises responses to the substantive assertion according to third factor (complexity) quartile values only.

Table 43: Categorisation of responses to substantive assertion by ‘financial reporting’ complexity factor scores

Complexity factor groups	Disagree strongly or disagree	Neither agree nor disagree	Agree	Agree strongly	Total
Quartile 1	19%	11%	43%	27%	100%
Quartile 2	16%	24%	48%	11%	100%
Quartile 3	8%	24%	45%	23%	100%
Quartile 4	8%	18%	45%	29%	100%
All	13%	19%	45%	22%	100%

The Chi-square outcome for Table 43 is $X^2(9, N=249) = 13.838, p = 0.1282$. A p-value of 0.1282 indicates that there is no statistically significant relationship between the complexity of financial reporting and responses to the substantive assertion. The low p-value is consistent with the visual left-to-right downward diagonal in Table 43. However, the p-value is insufficiently low to reject the null hypothesis. An above

average percentage of ‘agree strongly’ respondents fall into the first quartile category is again notable and suggest that some respondents rated one or more of the complexity factor scales towards the lower end.

In summary, when interpretations of ‘financial reporting’ are examined at individual factor level, the integrity factor is the only factor that is significantly related to responses to the substantive assertion. Visually notable is the percentage of ‘agree strongly’ respondents whose factor scores fall into the first quartile for each of the three factors and the percentage of ‘disagree strongly or disagree’ respondents whose factor scores fall into the second and third quartiles. It appears that some ‘agree strongly’ respondents have a low opinion of financial reporting and regard XBRL as a way to improve financial reporting. ‘Many ‘disagree strongly or disagree’ respondents do not have extreme perceptions of financial reporting one way or the other, and either way, do not perceive XBRL as the technology that changes anything. These distribution patterns for the factor scores help to explain why, when examined on a three-factor basis, no significant relationships exist between responses to substantive assertions and the factor scores (Table 36).

5.4.3.3 Democratisation

Table 44 categorises responses to the substantive assertion according to first factor (positivity) quartile values only.

Table 44: Categorisation of responses to substantive assertion by ‘democratisation’ positivity factor scores

Positivity factor groups	Disagree strongly or disagree	Neither agree nor disagree	Agree	Agree strongly	Total
Quartile 1	12%	24%	58%	7%	100%
Quartile 2	19%	17%	53%	10%	100%
Quartile 3	3%	12%	52%	33%	100%
Quartile 4	17%	8%	29%	46%	100%
All	13%	15%	48%	24%	100%

The Chi-square statistic for Table 30 is $X^2(9, N=234) = 43.126, p < 0.0001$. ‘Agree strongly’ and ‘disagree strongly or disagree’ respondents are comparatively well represented in the fourth quartile which suggests that these respondents rated ‘democratisation’ relatively highly in terms of positivity. This helps to explain the above average representation of ‘disagree strongly or disagree’ respondents in the second group (15%) in Table 37. These respondents appear to disagree with the substantive assertion because XBRL does not achieve their perception of the positivity of democratisation. ‘Agree’ and ‘neither agree nor disagree’ respondents predominantly fall into the first and second quartiles, which suggest that these respondents are comparatively moderate in terms of their interpretation of democratisation.

Table 45 categorises responses to the substantive assertion according to second factor (completeness) quartile values only.

Table 45: Categorisation of responses to substantive assertion by ‘democratisation’ completeness factor scores

Completeness factor groups	Disagree strongly or disagree	Neither agree nor disagree	Agree	Agree strongly	Total
Quartile 1	24%	14%	42%	20%	100%
Quartile 2	17%	17%	45%	21%	100%
Quartile 3	3%	17%	57%	22%	100%
Quartile 4	7%	14%	47%	32%	100%
All	13%	15%	48%	24%	100%

The visual pattern of above average percentages suggests that there is some association between completeness factor scores and responses to the substantive assertion. Furthermore, the association appears to be linearly associated with responses to the substantive assertion. The Chi-square statistic for Table 45 is $X^2(9, N=234) = 16.319$, $p = 0.0605$. A p-value of 0.0605 falls marginally short of the accepted threshold (0.05) for rejecting the null hypothesis of no relationship between perceptions of the completeness of democratisation and responses to the substantive assertion.

‘Disagree strongly or disagree’ respondents are most highly represented in the first quartile, ‘neither agree nor disagree’ respondents similarly in the second quartile, ‘agree’ respondents in the third quartile and ‘agree strongly’ respondents in the fourth quartile. It appears that the scale ratings of many respondents regarding the completeness of ‘democratisation’ correspond to their views on whether XBRL democratises financial reporting. This raises the possibility that the reason respondents agree or disagree with the substantive assertion is based on the extent to which they consider that XBRL ‘completes’ financial reporting.

In summary, the investigation of individual democratisation factors reveals significant associations with responses to the substantive assertion. In particular, ‘agree strongly’

respondents rate the positivity factor relatively highly. That some ‘disagree strongly or disagree’ respondents also rate the first factor relatively highly suggests that respondents can be positive about democratisation in general yet disagree with the substantive assertion. ‘Agree’ and ‘neither agree nor disagree’ respondents are relatively moderate in term of positivity factor ratings. Regarding the completeness factor, there appears to be a linear relationship between factor scores and responses to the substantive assertion. This suggests that survey respondents regard the ‘democratisation’ of financial reporting to be effectively synonymous with the completeness of financial reporting.

Overall, in the case of each of ‘XBRL’, ‘financial reporting’ and ‘democratisation’, the first factor is significantly related to responses to the substantive assertion. Perceptions of the utility of XBRL, integrity of financial reporting and positivity regarding democratisation are instrumental in terms of agreement or disagreement with the substantive assertion.

5.5 Tests for significant associations between responses to the substantive assertion and individual scale ratings

Section 5.4 is concerned with the possibility of significant relationships between responses to the substantive assertion and categorised factor scores. The possibility of significant relationships is investigated at both multiple and individual factor levels. The possibility of significant relationships between interpretations of the concepts and responses to the substantive assertion is now undertaken at scale level mindful of the fact that significant relationships are evident at factor level. Section 5.5 therefore completes the investigation of potential relationships between responses to the

substantive assertion and interpretations of its constituent concepts by examining the individual scales that underpin the derived factors.

The investigation of significant relationships between individual scales and responses to the substantive assertion is undertaken by reference to the Kruskal-Wallis test. The Kruskal-Wallis test is a non-parametric statistical test of significant relationships between multiple independent samples of ordinal data (Smith 2003, p.73). Notwithstanding, parametric analysis of variance (ANOVA) testing is also undertaken on the basis that the differences between parametric and non-parametric testing is often miniscule (Smith 2003, p.57). ANOVA testing may provide helpful corroborative support for the non-parametric test outcomes. However, reliance is primarily placed on non-parametric testing for the purpose of conclusions.

5.5.1 XBRL

Analysis of the 'XBRL' concept is completed by examining average scale ratings (Table 46), corresponding standard deviations (Table 47) and investigating whether there are statistically significant relationships between individual scales and responses to the substantive assertion (Table 48).

Values highlighted in red in Tables 46 and 47 are above the average rating for 'all' respondents for that scale. Ratings highlighted in green are below the average for 'all' respondents for that scale.

Table 46: Average scale ratings for the ‘XBRL’ concept

1	2	3	4	5	6	7	Factor	All (average)	Disagree strongly or disagree	Neither agree nor disagree	Agree	Agree strongly
unhelpful						helpful	1	5.99	5.59	5.40	5.97	6.77
impotent						powerful	1	5.98	5.31	5.65	6.04	6.54
meaningless						meaningful	1	5.92	5.59	5.48	5.86	6.63
productivity decreasing						productivity increasing	1	5.69	4.84	5.23	5.81	6.32
weak						strong	1	5.43	4.94	4.98	5.41	6.16
not democratising						democratising	1	5.40	4.38	4.60	5.51	6.45
sceptical						believing	1	5.40	4.66	4.83	5.40	6.30
inefficient						efficient	1	5.35	4.63	4.67	5.45	6.13
constraining						liberating	1	5.00	4.09	4.54	5.05	5.82
cumbersome						usable	2	4.53	3.75	4.13	4.60	5.20
obscure						clear	2	4.14	3.69	3.79	4.11	4.77
difficult						easy	2	3.18	2.69	3.10	3.12	3.68
complex						simple	2	2.58	2.03	2.50	2.56	3.02
unsuccessful						successful	3	4.81	4.16	4.17	4.88	5.61
unavailable						available	3	4.57	4.19	4.42	4.50	5.05

Scales are, for each factor, listed in descending order by reference to the average rating for all survey respondents. The averages indicate for example that, overall, respondents rate XBRL most highly in terms of being helpful, powerful and meaningful but regard it as relatively complex, difficult, and somewhat cumbersome and obscure. Ratings for the scales that constitute the first factor (utility) are relatively high in comparison to the scales that constitute the second and third factors (usability and availability respectively). The lowest rating for all respondents for a utility factor scale is 5.0 (*constraining-liberating*). It is evident that, even for respondents who disagree with the substantive assertion, scale ratings for the utility factor are all towards the higher ends of the scales. By comparison, the scale ratings that correlate highly with the usability factor in particular are noticeably lower. The average ratings for the *difficult-easy* and *complex-simple* scales are towards the lower ends of the scales for all respondent groups. It is apparent that the complexity of XBRL is acknowledged even by those who agree with the substantive assertion.

The visual pattern highlights the extent to which ‘agree strongly’ respondents rate all scales higher than any other respondent group. With the exception of two scales (*‘unhelpful-helpful’* and *‘meaningless-meaningful’*), the average rating for each scale declines consistently across the respondent groups from a highest rating for ‘agree strongly’ respondents to the lowest rating for ‘disagree strongly or disagree’ respondents. This pattern of averages is further evidence of the significant relationship, already identified at factor level, between interpretations of ‘XBRL’ and responses to the substantive assertion.

Table 47: Standard deviations for each ‘XBRL’ scale

1	2	3	4	5	6	7	Factor	All (std dev)	Disagree strongly or disagree	Neither agree nor disagree	Agree	Agree strongly
meaningless						meaningful	1	1.01	1.32	0.96	0.87	0.70
impotent						powerful	1	1.06	1.57	1.03	0.85	0.73
unhelpful						helpful	1	1.07	1.56	1.15	0.83	0.46
weak						strong	1	1.16	1.48	0.95	1.06	0.92
productivity decreasing						productivity increasing	1	1.30	1.89	1.25	0.98	1.09
sceptical						believing	1	1.36	1.72	1.26	1.20	0.94
not democratising						democratising	1	1.40	1.73	1.11	1.15	1.03
inefficient						efficient	1	1.43	1.87	1.49	1.16	1.09
constraining						liberating	1	1.56	1.74	1.34	1.40	1.51
complex						simple	2	1.45	0.92	1.34	1.33	1.83
difficult						easy	2	1.56	1.47	1.39	1.44	1.83
obscure						clear	2	1.71	1.78	1.50	1.51	2.02
cumbersome						usable	2	1.78	1.89	1.65	1.65	1.82
unsuccessful						successful	3	1.37	1.46	1.30	1.15	1.32
unavailable						available	3	1.79	1.79	1.64	1.72	1.93

Table 47 lists, for each factor and in ascending order, the standard deviations for each scale for ‘all’ respondents. A lower standard deviation value indicates less of a dispersion of ratings around the average rating whereas a higher standard deviation indicates a greater dispersion.

A visual inspection of Table 47 highlights the higher than average standard deviations that are attributable to ‘disagree strongly or disagree’ respondents. This suggests a comparatively wide range of ratings for the majority of scales and therefore indicates a lower degree of within-group consensus regarding scale ratings. By comparison, based on standard deviations that are below the averages for ‘all’ respondents, there is relative consensus within the ‘agree strongly’ group for the utility factor. The relatively high standard deviations for the usability factor scales for the ‘agree strongly’ group are also noteworthy and confirms a wide range of perceptions regarding the complexity of XBRL. The high standard deviation value for the ‘*unavailable-available*’ scale across all the groups provides evidence of the absence of consensus as to whether XBRL is, in practical terms, currently available.

The outcome of the Kruskal-Wallis testing for significant relationships between individual scales and responses to the substantive assertion is presented in Table 48.⁷⁷ Where significant differences between groups are statistically evident for individual scales, pair-wise comparisons of groups are undertaken using Dunn’s procedure⁷⁸ in order to identify the groups that differ significantly.

⁷⁷For the purpose of this test, each scale is assumed to be ordinal. An ANOVA test is also carried out for each scale for comparability with the Kruskal-Wallis test. The result of the Kruskal-Wallis and corresponding ANOVA tests are the same (in terms of identifying whether the groups are significantly different from each other) for 13 of the 15 scales. The ANOVA test identifies significant differences for the ‘*simple-complex*’ and ‘*easy-difficult*’ scales whereas the Kruskal-Wallis test does not. The non-parametric test outcomes are assumed more reliable for analysis purposes.

⁷⁸Dunn’s procedure is a post-hoc test of pair-wise comparisons in order to identify which groups cause the rejection of the null hypothesis in the Kruskal-Wallis test.

Table 48: Kruskal-Wallis test for significant relationships between individual ‘XBRL’ scales and responses to the substantive assertion

		Mean of summed ranks					Significant groups based on post-test pair-wise comparisons		
Scale	Factor	Disagree strongly or disagree (1/2)	Neither agree nor disagree (3)	Agree (4)	Agree strongly (5)	p-value (two-tailed)	a	b	c
helpful – unhelpful	1	111.328	84.771	117.412	182.607	<0.0001	5	4,2,1	3,2,1
productivity increasing-productivity decreasing	1	94.672	94.844	125.580	167.009	<0.0001	5	4,3,2,1	
powerful – impotent	1	96.109	99.323	123.708	166.125	<0.0001	5	4,3,2,1	
democratising-not democratising	1	82.625	78.688	127.000	184.875	<0.0001	5	4	3,2,1
liberating – constraining	1	88.016	99.240	124.310	169.607	<0.0001	5	4,3,2,1	
strong – weak	1	103.234	92.771	121.438	172.250	<0.0001	5	4,3,2,1	
efficient – inefficient	1	99.906	89.813	124.580	170.348	<0.0001	5	4,2,1	3,2,1
meaningful – meaningless	1	109.625	90.948	116.916	179.286	<0.0001	5	4,3,2,1	
believing – sceptical	1	94.703	93.031	122.265	175.232	<0.0001	5	4,3,2,1,	
simple – complex	2	101.797	122.865	126.013	138.045	0.129	5,4,3,2,1		
easy – difficult	2	102.391	122.656	123.637	142.679	0.073	5,4,3,2,1		
clear – obscure	2	106.719	111.146	124.261	148.813	0.016	5,4	4,3,2,1	
usable – cumbersome	2	96.141	107.406	125.513	155.536	0.0003	5,4	4,3,2,1	
available – unavailable	3	110.656	116.281	122.049	146.625	0.058	5,4,3,2,1		
successful – unsuccessful	3	94.438	90.813	125.889	169.973	<0.0001	5	4,2,1	3,2,1

The values for the ‘mean[s] of summed ranks’ are calculated by ranking each response to the substantive assertion⁷⁹, summing the ranks by reference to ratings on each scale and calculating the mean for each category. The p-value indicates the likelihood that the differences between the means occur by chance.

⁷⁹ ‘Agree strongly’ response corresponds to a ranking of five, ‘agree’ corresponds to four, ‘neither agree nor disagree’ corresponds to three, ‘disagree’ corresponds to two and ‘disagree strongly’ corresponds to one.

Each scale in Table 48 is listed according to the factor with which it correlates most strongly. The results support the earlier findings that the first factor is the most significant in terms of distinguishing between groups. The Kruskal-Wallis evidence confirms that ‘agree strongly’ respondents are, without exception, significantly different for every scale that constitutes the utility factor. Respondents in this group consistently selected points on scales that represented the extreme ‘positive’ end of the scale. With the exceptions of perceived helpfulness, democratisation and efficiency, none of the other utility factor scales distinguished between respondents who merely agree with, disagree with or are neutral about the substantive assertion. ‘Agree’ respondents are distinguished from those who are neutral in terms of the helpfulness of XBRL, whether it is democratising and how efficient it is. As such, it may be concluded that, with regard to the scales that constitute the utility factor, ‘agree strongly’ respondents are significantly different to the other groups. Respondents who agree are, with the exception of three scales, not significantly different from those who are neutral or disagree.

Regarding the usability factor, the similarity of overall factor interpretation across all respondent groups is evident from the fact that the Kruskal-Wallis test did not identify any group to be significantly different for the ‘*simple-complex*’ or ‘*easy-difficult*’ scales. This is consistent with the Chi-square statistic for Table 39, which indicates no significant relationship between usability factor scores and responses to the substantive assertion. The Kruskal-Wallis outcome for the other two scales that constitute the usability factor, ‘*clear-obscure*’ and ‘*usable-cumbersome*’, reveals that ‘agree strongly’ respondents are distinguished in particular from respondents who are neutral or who disagree. This indicates that those who specifically do not agree with the substantive

assertion appear to take their positions of neutrality or disagreement because of a perception that XBRL is too obscure and cumbersome. The absence of significant between-group differences can also be attributed to standard deviations for these scales (see Table 47), which are higher than standard deviations for scales that correlate highly with the utility factor.

The Kruskal-Wallis outcome for the first of the scales that correlates highly with the availability factor, '*available-unavailable*', does not identify a significant difference between the groups although a p-value of 0.058 suggests that the groups are very close to being significantly different (in statistical terms). The difference between the mean of summed ranks for the 'disagree strongly or disagree' group (110.656) and the 'agree strongly' group (146.625) supports this suggestion. However, the relatively high standard deviations across all groups for this scale in Table 47 indicate that there is a wide range of ratings in each group. This militates against the identification of any individual group as significantly different.

Regarding the '*successful-unsuccessful*' scale, 'agree strongly' respondents regard XBRL as significantly more successful than those who merely agree. Respondents who expressed a position of neutrality regarding the substantive assertion also differed significantly from 'agree strongly' and 'agree' respondents. Overall, the outcomes of the Kruskal-Wallis testing on scales that correlate highly with the availability factor are consistent with the Chi-square result from Table 40. The Chi-square p-value of 0.1796 suggests that differences between groups are approaching statistical significance but not sufficiently to statistically reject the null hypothesis. The investigation of individual scales confirms a similarity of interpretation between the groups for the '*available-*

unavailable' scale but a difference of interpretation that is statistically significant for the *'successful-unsuccessful'* scale.

Overall, Table 48 provides complementary scale-level insights to the significant differences initially identified at three-factor level in Table 35. Chi-square testing of the data included in Table 35 identifies relationships between factor scores and responses to the substantive assertion. Tables 38 to 40 investigate this significance by individual factor, the outcome of which is the identification of the first factor as the key factor that distinguishes between the groups. Table 48 confirms that 'agree strongly' respondents are significantly different from the other groups. Table 48 also provides statistical insight as to why the Chi-square testing of the data in Tables 39 and 40 are not significant. In the case of the four scales that constitute the second factor, two do not distinguish between the groups to a statistically significant extent. In the case of the two scales that comprise the third factor, only one distinguishes significantly between the groups.

5.5.2 Financial reporting

The possibility of significant relationships between interpretations of 'financial reporting' and responses to the substantive assertion is hereunder examined at scale level mindful of the fact that a significant relationship is evident at factor level. The integrity factor, in particular, is related to responses to the substantive assertion whereas the second and third factors (flexibility and complexity respectively), taken individually, are not related to responses to the substantive assertion to a statistically significant degree.

The scale level analyses are presented in Tables 49, 50 and 51.

Table 49: Average scale values for the ‘financial reporting’ concept

1	2	3	4	5	6	7	Factor	All (average)	Disagree strongly or disagree	Neither agree nor disagree	Agree	Agree strongly
worthless					valuable		1	5.88	5.94	5.81	5.89	5.89
pointless					beneficial		1	5.76	5.78	5.75	5.69	5.88
uninformative					informative		1	5.35	5.31	5.17	5.42	5.41
impotent					powerful		1	5.23	4.91	5.17	5.28	5.36
dishonest					honest		1	5.00	5.00	4.85	5.08	4.95
unreliable					reliable		1	4.91	4.91	4.83	5.01	4.77
disreputable					reputable		1	4.88	4.84	4.79	4.84	5.04
unhealthy					healthy		1	4.84	4.63	4.96	4.92	4.68
inadequate					adequate		1	4.36	4.09	4.27	4.60	4.11
inflexible					flexible		2	4.51	4.09	4.83	4.54	4.39
undemocratic					democratic		2	4.29	3.91	4.27	4.30	4.50
static					dynamic		2	4.14	3.66	4.17	4.24	4.18
not influential					influential		3	5.59	5.44	5.38	5.58	5.88
difficult					easy		3	2.86	2.84	3.15	2.81	2.70
complex					simple		3	2.15	2.56	2.15	2.20	1.82

Grouping the scales by reference to factors reveals consistencies with the visual patterns evident at factor level in Tables 41, 42 and 43. Notwithstanding disagreement with the substantive assertion, ‘disagree strongly or disagree’ respondent scale ratings are above average on the ‘worthless-valuable’, ‘pointless-beneficial’, ‘dishonest-honest’ and ‘complex-simple’ scales. The average scale ratings for ‘disagree strongly or disagree’ respondents are the lowest of any group for only six of the fifteen scales. This helps to explain why, in Tables 41 and 42 in particular, the factor scores of ‘disagree strongly or disagree’ respondents fall into the second and third quartiles. These ratings suggest that while respondents may disagree with the substantive assertion, it is not necessarily because of poor regard for financial reporting as a concept. It confirms earlier conclusions that these respondents are of the view that XBRL is not the best means by which financial reporting is democratised.

Although the majority of above average scale ratings are among the ‘agree strongly’ and ‘agree’ groups, it is noticeable that ratings on the ‘*dishonest-honest*’, ‘*unreliable-reliable*’, ‘*unhealthy-healthy*’, ‘*inadequate-adequate*’, ‘*inflexible-flexible*’, ‘*difficult-easy*’ and ‘*complex-simple*’ scales for the ‘agree strongly’ group are below the overall average rating for those scales. It appears that some ‘agree strongly’ respondents regard ‘financial reporting’ as highly valuable, beneficial, informative and powerful but see room for improvement in terms of its honesty, reliability, healthiness and adequacy. This explains why, in Tables 41, 42 and 43, a significant percentage of respondents who fall into the first quartile of factor scores are ‘agree strongly’ respondents. The inference is that these respondents regard XBRL as the means of resolving the perceived shortcomings of financial reporting.

The average scale ratings of respondents who ‘agree’ with the substantive assertion are, with the exception of four scales, above the average for ‘all’ respondents. The differences between scale ratings for ‘agree’ respondents and ‘all’ respondents is not significant for any scale. This is unsurprising given that ‘agree’ respondents comprise 45% of ‘all’ respondents. The scale ratings for respondents who ‘neither agree nor disagree’ with the substantive assertion are below the average for ‘all’ respondents for the majority of scales. The most notable exceptions are the ‘*inflexible-flexible*’ and ‘*static-dynamic*’ scales, which are two of the three scales that constitute the flexibility factor. This explains the strong representation of ‘neither agree nor disagree’ respondents in the third and fourth quartiles of Table 42.

Table 50 presents the standard deviations for each ‘financial reporting’ scale.

Table 50: Standard deviations for each scale for the ‘financial reporting’ concept

1	2	3	4	5	6	7	Factor	All (std dev)	Disagree strongly or disagree	Neither agree nor disagree	Agree	Agree strongly
pointless					beneficial		1	0.97	0.93	1.05	0.90	1.02
worthless					valuable		1	1.12	0.90	1.30	1.00	1.28
dishonest					honest		1	1.26	1.37	1.22	1.17	1.37
disreputable					reputable		1	1.32	1.12	1.26	1.27	1.52
impotent					powerful		1	1.36	1.23	1.28	1.31	1.53
uninformative					informative		1	1.42	1.51	1.61	1.32	1.40
unhealthy					healthy		1	1.45	1.36	1.29	1.36	1.72
unreliable					reliable		1	1.48	1.49	1.37	1.35	1.79
inadequate					adequate		1	1.81	1.83	1.55	1.75	2.03
undemocratic					democratic		2	1.50	1.31	1.22	1.41	1.90
inflexible					flexible		2	1.70	1.79	1.45	1.55	2.02
static					dynamic		2	1.87	1.69	1.62	1.88	2.10
not influential					influential		3	1.21	1.43	1.17	1.09	1.27
complex					simple		3	1.22	1.34	1.08	1.30	0.95
difficult					easy		3	1.67	1.48	1.79	1.71	1.52

Above average standard deviations are particularly noticeable for the ‘agree strongly’ and ‘disagree strongly or disagree’ respondents. These values suggest that the degree of within-group consensus is lower in comparison to the ‘agree’ and ‘neither agree nor disagree’ respondents

The scale standard deviations for ‘agree strongly’ respondents are, with the exceptions of the ‘*uninformative-informative*’, ‘*complex-simple*’, and ‘*difficult-easy*’ scales, above average for ‘all’ respondents. This confirms an absence of consensus among these respondents regarding an interpretation of ‘financial reporting’. ‘Disagree strongly or disagree’ respondents similarly reveal a relative absence of consensus on the basis of seven scales for which the standard deviation is above the average for ‘all’ respondents. This contrasts with the ‘agree’ and ‘neither agree nor disagree’ respondents, for whom most scale standard deviations are below the corresponding scale average for ‘all’

respondents. This suggests a relative consensus within each of these groups regarding scale ratings.

Kruskal-Wallis⁸⁰ testing of each scale is presented in Table 51.

Table 51: Kruskal-Wallis test for significant relationships between individual ‘financial reporting’ scales and responses to the substantive assertion

Scale	Factor	Mean of summed ranks				p-value (two-tailed)	Significant groupings based on post-test pairwise comparisons	
		Disagree strongly or disagree (1/2)	Neither agree nor disagree (3)	Agree (4)	Agree strongly (5)		a	b
reliable–unreliable	1	124.063	120.167	128.248	123.125	0.9147	5,4,3,2,1	
reputable–disreputable	1	118.250	120.021	122.770	137.625	0.4754	5,4,3,2,1	
honest–dishonest	1	128.031	115.240	129.531	122.491	0.6711	5,4,3,2,1	
adequate–inadequate	1	114.922	118.281	134.748	116.848	0.2649	5,4,3,2,1	
healthy–unhealthy	1	112.656	130.646	128.018	121.125	0.6436	5,4,3,2,1	
beneficial–pointless	1	122.969	127.698	118.469	137.027	0.4013	5,4,3,2,1	
informative–uninformative	1	124.266	118.010	126.416	128.554	0.8742	5,4,3,2,1	
powerful–impotent	1	104.125	119.125	127.504	136.911	0.1653	5,4,3,2,1	
valuable–worthless	1	123.625	125.781	121.646	131.884	0.8280	5,4,3,2,1	
flexible–inflexible	2	108.984	136.771	125.155	123.750	0.3931	5,4,3,2,1	
dynamic–static	2	106.625	125.313	128.761	127.643	0.4693	5,4,3,2,1	
democratic–undemocratic	2	107.422	120.958	125.403	137.696	0.2618	5,4,3,2,1	
simple–complex	3	148.578	128.073	126.088	106.696	0.0431	5,4,3	4,3,2,1
easy–difficult	3	130.844	136.792	120.314	121.009	0.5116	5,4,3,2,1	
influential–not influential	3	121.766	109.021	121.208	148.196	0.0211	5,4,2,1	4,3,2,1

Each scale in Table 51 is listed according to the factor with which it correlates most strongly. Regarding the integrity factor, no group was identified as significantly different from any other. This outcome supports comments made in relation to Tables 49 and 50. Although there is a visual suggestion in Table 49, particularly in relation to

⁸⁰The Kruskal-Wallis test identifies significant differences for the ‘simple–complex’ and ‘influential–not influential’ whereas the ANOVA test did not. The non-parametric test outcomes are assumed more reliable for analysis purposes.

the 'agree' and 'neither agree nor disagree' respondents that scale averages increase with agreement, the suggestion is not supported statistically by the Kruskal-Wallis test outcome. Furthermore, the suggestion does not extend, either visually or statistically, to 'agree strongly' and 'disagree strongly or disagree' respondents.

The Kruskal-Wallis outcome in relation to the integrity factor appears, at first glance, inconsistent with the Chi-square test result from Table 41, which categorises responses to the substantive assertion according to integrity factor scores and returns a significant p-value of 0.0026. As factor scores are derived from individual scale ratings, it is reasonable to expect that the significant relationship in Table 41 should be replicated in Table 51.

It is posited that Table 51 identifies no significantly different group because the significant relationship identified in Table 41 is due to within- rather than between-group distributions of factor scores. Tables 49 and 50 reveal a combination of below average scale ratings and high standard deviations for a number of scales for 'agree strongly' respondents. Thus, there are different interpretations among 'agree strongly' respondents as to the integrity of financial reporting. Some 'agree strongly' respondents rate it highly on several integrity factor scales with the result that the integrity factor scores fall into the fourth quartile in Table 41. However, other 'agree strongly' respondents rate it less highly with the result that integrity factor scores fall into the first quartile in Table 41. The resultant spread of factor scores across the quartiles in Table 41 for 'agree' strongly' respondents is significantly different from the spread of factor scores for the other groups, most notably the 'disagree strongly or disagree' respondents for whom there are concentrations of integrity factor scores in the second and third

quartiles in Table 41. These patterns explain the Chi-square p-value of 0.0026 for Table 41. It is concluded that the statistically significant Chi-square test statistic based on Table 41 must be due to within-group factor score distributions that only become statistically significant at a factorial rather than scale level of analysis.

The Kruskal-Wallis outcome in Table 51 in relation to the flexibility factor scales indicates that, overall, the groups are similar to each other. No group was identified as being significantly different from the other groups for any of the three scales that constitute the flexibility factor. This outcome is consistent with the outcome of testing on Table 42 for which a Chi-square p-value of 0.7593 is returned. The flexibility factor scales in Table 49 indicate that the average scale values for the ‘agree strongly’, ‘agree’ and ‘neither agree nor disagree’ respondents are very comparable. The equivalent average scale ratings for the ‘disagree strongly or disagree’ respondents appear to be somewhat lower but not significantly so (based on the Chi-square and Kruskal-Wallis test outcomes).

The Kruskal-Wallis outcome in Table 51 in relation to complexity factor scales indicates that there are statistically significant differences between groups for two of the three scales that constitute the complexity factor. Specifically, there is a significant difference between ‘agree strongly’ and ‘disagree strongly or disagree’ respondents in relation to the ‘*simple-complex*’ scale. There is also a significant difference between ‘agree strongly’ and ‘neither agree nor disagree’ respondents in relation to the ‘*influential-not influential*’ scale. The average ratings on these scales in Table 49 indicate that ‘agree strongly’ respondents interpret ‘financial reporting’ to be significantly more complex than ‘disagree strongly or disagree’ respondents.

Respondents who ‘agree strongly’ with the substantive assertion are doing so on the basis that financial reporting is excessively complex in its current state (rating it at 1.82 on the ‘*complex-simple*’ scale) and that XBRL can therefore assist by simplifying the process. In contrast, ‘disagree strongly or disagree’ respondents rate ‘financial reporting’ at 2.56. While this does not indicate that these respondents interpret ‘financial reporting’ to be simple, it is the highest scale rating of any of the groups for this scale. This suggests that while ‘disagree strongly or disagree’ respondents regard ‘financial reporting’ as complex, they do not regard XBRL as a way to reduce its complexity. ‘Disagree strongly or disagree’ respondents also return a higher average rating for the ‘*difficult-easy*’ scale (2.84) than the ‘agree strongly’ respondents (2.70).

All groups rate ‘financial reporting’ highly in terms of its capacity to influence. The lowest average rating for this scale in Table 49 is 5.38 for ‘neither agree nor disagree’ respondents. Kruskal-Wallis testing indicates that ‘neither agree nor disagree’ respondents are significantly different from ‘agree strongly’ respondents (for whom the average scale rating is 5.88). This suggests that ‘agree strongly’ respondents regard ‘financial reporting’ as having capacity to influence but that it is highly constrained by its complexity, hence their strong agreement that XBRL can make a substantial difference. ‘Neither agree nor disagree’ respondents rate ‘financial reporting’ lower in terms of its capacity to influence and higher in terms of its simplicity, which perhaps helps to explain the neutral response to the substantive assertion.

Notwithstanding the significant between-group scale differences identified in Table 51 for the complexity factor, the differences did not roll up to significance at factor level, as measured by Chi-square testing of the data in Table 43. The visual pattern presented

in Table 43 suggests the possibility of a significant relationship and this is supported by the significant differences returned by Kruskal-Wallis testing. A Chi-square p-value of 0.1282 is not sufficiently low to reject the null hypothesis of no significant between-group differences at a factorial level of analysis but it is sufficiently low to be consistent with the significant differences found for two individual scales.

5.5.3 Democratisation

The possibility of significant relationships between interpretations of ‘democratisation’ and responses to the substantive assertion is undertaken at scale level mindful of the fact that significant relationships are evident at factor level. Factor level analysis reveals that the first factor (positivity), in particular, is significantly related to responses to the substantive assertion whereas the second factor (completeness) falls marginally short of being related to a statistically significant degree. The results are presented in Tables 52, 53 and 54.

Table 52: Average scale ratings for the ‘democratisation’ concept

1	2	3	4	5	6	7	Factor	All (average)	Disagree strongly or disagree	Neither agree nor disagree	Agree	Agree strongly
bad						good	1	5.97	5.93	5.58	5.92	6.32
negative						positive	1	5.88	5.90	5.53	5.72	6.41
meaningless						meaningful	1	5.55	5.53	5.31	5.37	6.07
weak						strong	1	5.30	5.00	4.92	5.22	5.88
imaginary						real	1	5.28	4.97	5.00	5.12	5.96
feeble						vibrant	1	5.12	5.00	4.86	4.92	5.77
passive						active	1	5.09	4.53	4.78	5.04	5.70
untimely						timely	1	5.03	4.80	4.53	4.93	5.68
invisible						visible	1	4.97	4.93	4.94	4.84	5.25
individual						society	2	4.99	5.17	4.75	5.00	5.04
unsuccessful						successful	2	4.78	4.10	4.44	4.79	5.32
uncertain						certain	2	4.63	4.13	4.42	4.45	5.39
formless						formed	2	4.58	4.23	4.89	4.50	4.71
partial						whole	2	4.46	3.83	4.61	4.36	4.89
incomplete						complete	2	4.07	3.27	4.06	4.09	4.48

The average ratings for ‘agree strongly’ respondents are the highest of any group for 13 of the 15 scales. The exceptions are the ‘*individual-society*’ and ‘*formless-formed*’ scales. ‘Agree strongly’ ratings aside, the average ratings of ‘agree’ respondents are the highest on seven scales, those of ‘neither agree nor disagree’ respondents highest on three scales and those of ‘disagree strongly or disagree’ respondents highest on five scales. This suggests that, ‘agree strongly’ respondents apart, the other groups appear to be comparable across the 15 scales.

Regarding the positivity factor scales, ratings for ‘disagree strongly or disagree’ respondents are higher than for both ‘agree’ and ‘neither agree nor disagree’ respondents on five of the nine scales. This explains why, in Table 44, 17% of the fourth quartile scores relate to ‘disagree strongly or disagree’ respondents. Furthermore, notwithstanding relatively high ratings for the positivity factor scales, the completeness factor scales are rated consistently lower by ‘disagree strongly or disagree’ respondents. All completeness factor scales except the ‘*individual-society*’ scale were lower for ‘disagree strongly or disagree’ respondents than for any other group. This confirms that, whereas ‘disagree strongly or disagree’ respondents are as positive about the concept of democratisation as other groups, the extent to which financial reporting is ‘completed’ by XBRL appears to be a significant point of disagreement for these respondents.

The linear relationship between completeness factor scores and responses to the substantive assertion noted in Table 45 is supported by the consistent increases in average scale ratings across the groups for the ‘*unsuccessful-successful*’, ‘*uncertain-certain*’ and ‘*incomplete-complete*’ scales in Table 52. However, the fact that not more

than three of the six completeness factor scales follow this consistent gradual increase in average scale ratings explains why the Chi-square p-value for Table 45, at 0.0605, remains just above the 0.05 threshold for rejecting the null hypothesis.

Table 53 presents the standard deviations for each ‘democratisation’ scale.

Table 53: Standard deviations for each scale for the ‘democratisation’ concept

1	2	3	4	5	6	7	Factor	All (std dev)	Disagree strongly or disagree	Neither agree nor disagree	Agree	Agree strongly
meaningless						meaningful	1	1.05	1.12	1.10	1.04	0.82
bad						good	1	1.07	1.06	1.21	1.04	0.91
negative						positive	1	1.08	1.08	1.24	1.10	0.68
feeble						vibrant	1	1.20	1.15	0.98	1.19	1.16
weak						strong	1	1.20	1.18	1.19	1.08	1.25
passive						active	1	1.22	1.36	1.13	1.12	1.16
imaginary						real	1	1.26	1.45	1.25	1.17	1.05
untimely						timely	1	1.34	1.17	1.32	1.22	1.42
invisible						visible	1	1.42	1.44	1.35	1.37	1.50
unsuccessful						successful	2	1.32	1.60	1.38	1.19	1.12
formless						formed	2	1.35	1.41	0.94	1.32	1.54
uncertain						certain	2	1.38	1.43	1.28	1.28	1.33
partial						whole	2	1.46	1.63	1.06	1.35	1.64
incomplete						complete	2	1.55	1.53	1.29	1.41	1.79
individual						society	2	1.61	1.49	1.48	1.48	1.95

A visual inspection of Table 53 suggests that the greatest degree of consensus regarding scale ratings exists among ‘agree’ respondents. Except for the ‘*negative-positive*’ scale, all other standard deviations are below the corresponding standard deviations for ‘all’ respondents. The majority of standard deviations for ‘neither agree nor disagree’ respondents are also below the equivalent for ‘all’ respondents. Higher than average standard deviations are evident on seven scales for ‘agree strongly’ respondents, all but one of which are scales for which the average scale ratings fall into the bottom half of Table 53. For ‘agree strongly’ respondents therefore, higher average scale ratings

combine with lower standard deviations and lower average scale ratings combine with higher standard deviations.

Table 53 confirms that the most variation in scale responses for both factors occurs in the extreme ‘agree strongly’ and ‘disagree strongly or disagree’ respondent groups. ‘Agree’ respondents appear to have least variation in scale responses. Higher standard deviations are indicative of within-group differences. On this basis, there is some evidence of within-group differences, particularly in relation to the second factor for the ‘agree strongly’ and disagree strongly or disagree’ respondents.

Kruskal-Wallis testing of each scale is presented in Table 54⁸¹.

⁸¹The result of the Kruskal-Wallis and corresponding ANOVA tests are the same (in terms of identifying whether the groups were significantly different from each other) for all 15 scales.

Table 54: Kruskal-Wallis test for significant relationships between individual ‘democratisation’ scales and responses to the substantive assertion

Scale	Factor	Mean of summed ranks				p-value (two-tailed)	Significant groupings based on post-test pairwise comparisons	
		Disagree strongly or disagree (1/2)	Neither agree nor disagree (3)	Agree (4)	Agree strongly (5)		a	b
positive-negative	1	118.717	97.972	107.464	149.473	0.0002	5,2,1	4,3,2,1
meaningful-meaningless	1	116.350	103.333	105.545	151.134	0.0001	5,2,1	4,3,2,1
good-bad	1	115.250	95.778	113.487	140.696	0.0077	5,4,2,1	4,3,2,1
strong-weak	1	100.050	96.083	110.522	154.571	< 0.0001	5	4,3,2,1
vibrant-feeble	1	111.133	99.847	107.125	153.009	< 0.0001	5	4,3,2,1
real-imaginary	1	104.717	98.083	107.500	156.830	< 0.0001	5	4,3,2,1
timely-untimely	1	103.817	90.931	111.563	153.786	< 0.0001	5	4,3,2,1
visible-invisible	1	114.417	114.153	110.589	135.125	0.1416	5,4,3,2,1	
active-passive	1	91.283	98.306	113.143	152.598	< 0.0001	5	4,3,2,1
complete-incomplete	2	82.833	116.056	118.795	134.411	0.0080	5,4,3	4,3,2,1
successful-unsuccessful	2	91.150	100.375	116.746	144.134	0.0009	5,4	4,3,2,1
whole-partial	2	90.700	121.917	112.424	139.170	0.0085	5,4,3	4,3,2,1
formed-formless	2	101.100	129.542	113.313	126.920	0.1991	5,4,3,2,1	
certain-uncertain	2	94.800	106.014	109.045	153.955	< 0.0001	5	4,3,2,1
society-individual	2	122.650	103.847	115.585	127.348	0.3799	5,4,3,2,1	

Each scale in Table 54 is listed according to the factor with which it correlates most strongly. In relation to the positivity factor, there are significant between-group differences on all scales but one. The scale ratings of ‘agree strongly’ respondents are significantly different to ‘neither agree nor disagree’ respondents for all positivity factor scales with the exception of the ‘visible-invisible’ scale. The scale ratings of ‘agree strongly’ respondents are also significantly different to ‘agree’ respondents for all positivity factor scales with the exceptions of the ‘visible-invisible’ and ‘good-bad’ scales. The high ratings given by ‘disagree strongly or disagree’ respondents on the ‘positive-negative’, ‘meaningful-meaningless’, and ‘good-bad’ scales in Table 52 are reinforced by the fact that ‘disagree strongly or disagree’ respondents are grouped with ‘agree strongly respondents’ on these scales in Table 54 and are thereby identified as

significantly different to the other groups. The Kruskal-Wallis outcome regarding the positivity factor is unsurprising given the high average scale ratings for ‘agree strongly’ respondents that are evident in Table 52. Furthermore, that ‘disagree strongly or disagree’ respondents are grouped with ‘agree strongly’ respondents on a number of scales is consistent with the categorisation of factor scores in Table 44. The detail in Table 54 advises that, in terms of ‘democratisation’ being a particularly positive, meaningful, and good concept, ‘disagree strongly or disagree’ respondents rate it as highly as ‘agree strongly’ respondents and higher than either ‘agree’ or ‘neither agree nor disagree’ respondents. In relation to the remaining positivity factor scales (with the exception of ‘*visible-invisible*’), ‘agree strongly’ respondents ratings are significantly higher than all the other respondent groups.

Pair-wise comparisons in Table 54 for the completeness factor scales present a somewhat different pattern to the positivity factor. ‘Agree strongly’ respondents are significantly different from ‘disagree strongly or disagree’ respondents on four of the six completeness factor scales, the exceptions being the ‘*formed-formless*’ and ‘*society-individual*’ scales. The average scale ratings for the six completeness factor scales in Table 52 confirm that ‘agree strongly’ respondent ratings are notably higher than the corresponding ‘disagree strongly or disagree’ ratings. ‘Agree’ respondents are statistically distinguishable from ‘agree strongly’ respondents only for one completeness factor scale (‘*certain-uncertain*’). ‘Neither agree nor disagree’ respondents are distinguishable from ‘agree strongly’ respondents for only two completeness factor scales (‘*successful-unsuccessful*’ and ‘*certain-uncertain*’). Overall, ‘agree strongly’ respondents are distinguishable from the other respondent groups but, with regard to the ‘agree’ and ‘neither agree nor disagree’ respondents only in respect of

one or two scales. These respondent groups are more similar than they are different which helps to explain why the Chi-square testing of Table 45 returns a p-value greater than 0.05. It is only with regard to ‘disagree strongly or disagree’ respondents that the ‘agree strongly’ scale rating differences are more emphatic.

5.5.4 Conclusions on interpretations of ‘XBRL’, ‘financial reporting’ and ‘democratisation’

Recall from section 5.2.2 that, while 67% of survey respondents indicated that they either ‘agree strongly’ or ‘agree’ that XBRL democratises financial reporting, a primary objective of the thesis is to investigate the possibility that the concepts included in the substantive assertion may not be epistemically objective.

The possibility of epistemic subjectivity is investigated in sections 5.4 and 5.5 by assessing whether factor scores and scale ratings respectively are significant related to responses to the substantive assertion. The existence of significant relationships provides evidence that respondent factor scores/scale ratings are not randomly distributed within the interpretive frameworks derived for ‘all’ respondents. Rather, because distributions are related to responses to the substantive assertion, the implication is that responses to the substantive assertion are related to how the individual concepts are interpreted.

Investigations at multi-factorial and individual factor levels reveal significant associations between interpretations of ‘XBRL’ and responses to the substantive assertion. In particular, in comparison to the other respondent groups, ‘agree strongly’

respondents perceive 'XBRL' to be of significantly greater utility. Average scale ratings are consistently higher for this group than for the other respondent groups.

In relation to the 'financial reporting' concept, no significant association between a multi-factorial interpretation and responses to the substantive assertion is evident. Nor are associations particularly evident at individual scale level. However, at individual factor level, there is a significant association between the integrity of financial reporting and responses to the substantive assertion. However, this is attributable to differences within rather than between respondent groups, most particularly in relation to 'agree strongly' respondents. High standard deviations for scale ratings for this respondent group provide complementary evidence of the absence of a consensus within this group.

There is evidence of significant associations between interpretations of 'democratisation' and responses to the substantive assertion. However, it is not that 'agree' respondents are merely more positive about democratisation than 'disagree' respondents. The evidence indicates that many who disagree with the substantive assertion are positive about democratisation in a general sense but not in the specific context of XBRL. Furthermore, respondents who agree with the substantive assertion consistently appear to perceive 'democratisation' as a more complete phenomenon than respondents who disagree.

Also particularly noteworthy are the (i) consensus regarding the complexity of 'XBRL', and (ii) comparatively low communality coefficients for the '*democratic-undemocratic*' and '*democratising-not democratising*' scales. There is a high degree of consensus across all respondent groups that 'XBRL' is complex. This is evident from the comparatively low average scale ratings for the '*simple-complex*' and '*easy-difficult*'

scales in particular and the fact that there were no statistically significant differences between respondent groups regarding the usability of XBRL.

Furthermore, it is interesting that, although ‘democratisation’ is one of the concepts in the substantive assertion, neither the ‘*democratic-undemocratic*’ (for ‘financial reporting’) nor *democratising-not democratising*’ (for ‘XBRL’) scales are adjectives that respondents particularly choose when describing the concepts. This suggests that, whereas respondents may respond in the affirmative to a rhetoric of democratisation, their own interpretations are not expressed in these terms.

Returning to the matter of the concepts that comprise the substantive assertion, the evidence suggests that each of ‘XBRL’, ‘financial reporting’ and ‘democratisation’ is epistemically subjective. The identification of statistically significant relationships between interpretations of concepts and responses to the substantive assertion provides evidence that meanings are insufficiently shared within and between respondent groups.

The analysis continues with an assessment of (i) how representative the multi-factor interpretive frameworks for ‘all’ respondents are of each of the respondent groups, and (ii) the stability of the multi-factor interpretive frameworks of each respondent group.

5.6 Assessment of the representativeness of interpretive frameworks for ‘all’ respondents

Section 5.3 derives stable interpretive frameworks for ‘all’ respondents for each of the ‘XBRL’, ‘financial reporting’ and ‘democratisation’ concepts. The stability of each of the interpretive frameworks is assessed by reference to split-half reliability testing.

Splitting ‘all’ survey respondents into two random half-groups and factor analysing each half-group returns multi-factor structures that correlate strongly with each other.

Investigations of significant relationships between respondent factor scores and responses to the substantive assertion are undertaken in section 5.4 on the assumption that the multi-factor interpretive structures that apply to ‘all’ respondents are representative of the multi-factor structures that apply to each respondent group. For example, it is assumed that the three-factor interpretive structure for the ‘XBRL’ concept for ‘all’ respondents is the same as the three-factor structure for the ‘agree strongly’ respondents only. If this assumption does not hold, then conclusions regarding the epistemic nature of concepts within a single interpretive structure must be further contextualised.

Furthermore, the analysis presented in section 5.4 assumes that the interpretive structures of the respondent groups are stable. It is assumed, for example, that the interpretive structure for the ‘XBRL’ concept for ‘agree strongly’ respondents is as stable as the interpretive structure for ‘all’ respondents presented in Table 25. If this is not the case, then conclusions that the interpretive structures of each respondent group must be qualified appropriately.

This section investigates (i) the extent to which the interpretive structures for ‘all’ respondents may be assumed to be representative of each respondent group, and (ii) whether the interpretive structures of each respondent group are stable.

5.6.1 Similarity and stability of ‘XBRL’ interpretive frameworks

The three-factor structural interpretation of ‘XBRL’ for ‘all’ respondents is stable based on the results of split-half testing⁸². Appendices 15, 16, 17 and 18 to this thesis present a three-factor analysis for each of the ‘agree strongly’, ‘agree’, ‘neither agree nor disagree’, and ‘disagree strongly or disagree’ respondent groups respectively. The analyses are generated by collating the scale ratings for each respondent group and factor analysing them in the same way as the three-factor analysis of ‘all’ respondents. Table 55 summarises the factors with which each scale correlates most strongly for each group. The factor structures of the groups are thereby visually comparable.

Table 55: Comparative interpretive structures for the ‘XBRL’ concept

	All	Agree strongly	Agree	Neither agree nor disagree	Disagree strongly or disagree
First factor					
helpful-unhelpful	F1	F1	F1	F1	F1
liberating-constraining	F1	F3	F3	F3	F3
efficient-inefficient	F1	F2	F3	F3	F3
strong-weak	F1	F1	F1	F1	F1
powerful-impotent	F1	F1	F1	F1	F1
productivity increasing-productivity decreasing	F1	F3	F1	F1	F1
meaningful-meaningless	F1	F1	F1	F1	F1
believing-sceptical	F1	F1	F1	F1	F1
democratising-not democratising	F1	F3	F3	F3	F2
Second factor					
simple-complex	F2	F2	F2	F2	F3
clear-obscure	F2	F2	F2	F2	F2
usable-cumbersome	F2	F2	F2	F2	F2
easy-difficult	F2	F2	F2	F2	F2
Third factor					
available – unavailable	F3	F1	F1	F1	F2
successful – unsuccessful	F3	F1	F1	F1	F1

The first two factors include a majority of scales that are common to all respondent groups. The main exceptions are the ‘*liberating-constraining*’, ‘*efficient-inefficient*’ and ‘*democratising-not democratising*’ scales, which for ‘agree’ and ‘neither agree nor

⁸²See Table 25 in section 5.3.1.

disagree’ respondents are part of the third rather than the first factor. This indicates that, for these two groups, the third interpretive factor appears to be based primarily on the liberating and democratising effect of XBRL. The third factor scales for ‘all’ are part of the first factor for each of the individual respondent groups. The availability and success of XBRL appears to be interpreted by individual respondent groups as part of the first interpretive factor of XBRL and only becomes identifiable as a separate factor (availability) when all respondents are grouped together.

Whereas the visual comparison of the three-factor interpretive frameworks is helpful in terms of a high-level overview, it is necessary to assess respondent group similarities in terms that are supported statistically. Table 56 sets out the correlations between factor scores for individual respondent groups and ‘all’ respondents. This indicates the extent to which the three-factor structure of ‘all’ respondents is representative of the three-factor structure for each of the respondent groups.

Table 56: Correlations between factor scores for individual respondent groups and ‘all’ respondents for three-factor ‘XBRL’ structures

Group	F1	F2	F3	Respondents	%
Agree strongly	0.8849	0.9449	0.7173	56	22%
Agree	0.8187	0.9789	0.8770	113	45%
Agree strongly or agree	0.9882	0.9944	0.9788	169	68%
Neither agree nor disagree	0.7191	0.9234	0.8719	48	19%
Disagree strongly or disagree	0.6682	0.8718	0.6021	32	13%
All				249	100%

The correlation coefficients in Table 56 are calculated using the same approach as for split-half reliability testing – the factor pattern coefficients produced by factor analysis of each respondent group are applied to ‘all’ respondents and the resultant factor scores correlated with the original factor scores for ‘all’ respondents. Correlations in excess of 0.894 are highlighted.

As a majority of respondents ‘agree’ or ‘agree strongly’ with the substantive assertion, it is unsurprising that the three-factor structure of this combined group correlates strongly with the three-factor structure for ‘all’ respondents.

The stability of the second factor across all groups that is visually evident in Table 55 is confirmed in Table 56. With the exception of ‘disagree strongly or disagree’ respondents, the correlation between each of the groups and ‘all’ respondents for this factors exceeds 0.894. Even the correlation coefficient for ‘disagree strongly or disagree’ respondents is not significantly below the 0.894 threshold. These correlations provide strong evidence of a very high degree of similarity across groups in terms of the nature of the second factor (usability). This is also consistent with the findings of Table 39 from which it is concluded that there is no significant difference between groups in terms of the perceived complexity of ‘XBRL’.

Correlations for the first and third factors are not consistently as strong as for the second factor. A variation in the scales that map to the first factor is visually evident in Table 55. On the basis that the scales that map to the first factor for each respondent group differ from the first factor scales for ‘all’, it makes sense that factor scores for each group are affected by the variation in scales that constitute the first factor. Moreover, although some scales may be common in name across groups, this does not necessarily mean that individual scales are equally significant to each group. The strength of correlations between individual scales and factors may differ between groups.

Correlations for the third factor are the lowest of the three factors for each group with the exception of ‘neither agree nor disagree’ respondents. This outcome is also consistent with Table 55 to the extent that the most significant scales included for ‘all’

respondents in Table 55 are not the most significant scales for any other group. This is not to suggest that the other groups have no scales of any significance in common with ‘all’. It is just that the most significant scales are not common across the groups.

Correlations for ‘disagree strongly or disagree’ respondents are noticeably lower across all three factors in comparison to the other groups. The first factor correlation for ‘neither agree nor disagree’ respondents is also relatively low in comparison to the ‘agree strongly’ and ‘agree’ respondents. These correlations indicate that, whereas the three-factor structure of ‘all’ respondents is, to a significant extent, representative of the three-factor structures of the ‘agree’ or ‘neither agree nor disagree’ respondents, it is noticeably less representative of ‘disagree strongly or disagree’ respondents. To some extent, this can be attributed to the fact that the majority of ‘all’ agree with the assertion. However, there is some evidence that the three-factor structure of those who disagree with the substantive assertion differs from the three-factor structure of those who agree or are neutral.

Table 57 sets out within-group correlations for each factor. The correlations are calculated using the same approach as for split-half reliability testing. The purpose is to assess the stability of within-group interpretive structures.

Table 57: Within-group correlations for three-factor ‘XBRL’ structures

Group	F1	F2	F3
Agree strongly	0.9084	0.6453	0.5060
Agree	0.8784	0.6787	-0.0819
Neither agree nor disagree	0.8358	0.7780	0.5990
Disagree strongly or disagree	0.5764	0.8767	0.7597

Although only one correlation exceeds 0.894, all correlations except one exceed 0.50.

While this indicates a reasonably stable within-group three-factor structure, the

correlations are insufficiently strong to assert conclusively that, for each respondent group, random split-half three-factor interpretive structures are effectively the same as each other.

The outcome of within-group stability testing in Table 57 is consistent with the standard deviations for scale ratings presented in Table 47. Lower standard deviations are consistent with higher within-group correlations and vice versa.

5.6.2 Similarity and stability of ‘financial reporting’ interpretive frameworks

The three-factor interpretive framework for ‘financial reporting’ is concluded to be stable for ‘all’ respondents based on the results of split-half testing⁸³. Appendices 19, 20, 21 and 22 to this thesis present a three-factor analysis for each of the ‘agree strongly’, ‘agree’, ‘neither agree nor disagree’, and ‘disagree strongly or disagree’ groups respectively. Table 58 summarises the factors with which each scale correlates most strongly.

⁸³See Table 26 in section 5.3.2.

Table 58: Comparative factor structures for the ‘financial reporting’ concept

	All	Agree strongly	Agree	Neither agree nor disagree	Disagree strongly or disagree
First factor					
adequate - inadequate	F1	F1	F1	F1	F2
informative - uninformative	F1	F1	F1	F2	F2
reliable - unreliable	F1	F1	F1	F2	F2
healthy - unhealthy	F1	F2	F1	F1	F3
honest - dishonest	F1	F1	F1	F1	F1
reputable - disreputable	F1	F1	F1	F1	F1
beneficial - pointless	F1	F1	F1	F1	F3
powerful - impotent	F1	F3	F2	F1	F1
valuable - worthless	F1	F3	F2	F1	F3
Second factor					
flexible - inflexible	F2	F2	F2	F2	F2
dynamic - static	F2	F2	F2	F2	F2
democratic - undemocratic	F2	F1	F2	F1	F1
Third factor					
influential- not influential	F3	F3	F2	F2	F1
simple - complex	F3	F2	F3	F3	F3
easy - difficult	F3	F2	F3	F3	F3

The second and third factors appear to be similar across all respondent groups with the exception of the third factor for ‘agree strongly’ respondents. For this group, a third underlying factor comprises the ‘*powerful-impotent*’, ‘*valuable-worthless*’ and ‘*influential-not influential*’ scales.

The first factor scales are broadly similar across the groups with the exception of ‘disagree strongly or disagree’ respondents. Only three scales, ‘*honest-dishonest*’, ‘*reputable-disreputable*’ and ‘*powerful-impotent*’ are common to the first factors for both ‘all’ and ‘disagree strongly or disagree’ respondents. This suggests that the three-factor structure of the ‘disagree strongly or disagree’ group differs from that of the other groups.

Whereas the visual comparison of the three-factor interpretive frameworks is helpful in terms of a high-level comparison, it is necessary to identify and investigate the group similarities and differences in terms that can be supported statistically. Table 59 sets

out the correlations between factor scores for individual respondent groups and ‘all’ respondents. It provides an indication of the extent to which the three-factor structure for ‘all’ respondents is representative of the three-factor structure for each respondent group.

Table 59: Correlations between factor scores for individual respondent groups and ‘all’ respondents for three-factor ‘financial reporting’ structures

Group	F1	F2	F3	Respondents	%
Agree strongly	0.9689	- 0.6779	0.8318	56	22%
Agree	0.9900	0.9321	0.9751	113	45%
Agree strongly or agree	0.9913	0.9624	0.9688	169	68%
Neither agree nor disagree	0.8394	0.9555	0.6472	48	19%
Disagree strongly or disagree	- 0.7311	0.7834	0.9114	32	13%
All				249	100%

As a majority of respondents ‘agree’ or ‘agree strongly’ with the substantive assertion, it is unsurprising that the three-factor structure for ‘all’ respondents correlates strongly with the three-factor structure for these two respondent groups (individually and in combination).

The comparability between groups and the exception of the ‘disagree strongly or disagree’ group in relation to the first factor that is visually evident in Table 58 is reinforced by the strong correlations in the F1 column of Table 59. The negative correlation of -0.7311 in relation to the ‘disagree strongly or disagree’ group is unsurprising given that only three first factor scales are shared by ‘disagree strongly or disagree’ and ‘all’ respondents.

The strong correlations between each group and ‘all’ respondents for the second and third factors in Table 59 are also consistent with the visual indication presented in Table 58. The -0.6779 F2 correlation for the ‘agree strongly’ group is attributable to the fact

that there are no common scales between this group and ‘all’ respondents for the second factors.

Overall, the extent of comparability between groups that is visually evident in Table 58 is reinforced statistically in Table 59. With the exceptions of the second factor for the ‘agree strongly’ respondents and the first factor for the ‘disagree strongly or disagree’ respondents, the three-factor structure for ‘all’ respondents may be argued to be representative of the three-factor structure for each respondent group. As is the case with respondent group interpretations of the ‘XBRL’ concept, the group that appears to be least represented by the three-factor structure of ‘all’ respondents is the ‘disagree strongly or disagree’ group on the basis that this group differs with regard to the most significant first factor. The similarities between the remaining groups, which collectively constitute 87% of all respondents, indicate a high degree of consensus regarding the three-factor interpretive framework for ‘financial reporting’.

Table 60 sets out within-group correlations for each factor.

Table 60: Within-group correlations for three-factor ‘financial reporting’ structures

Group	F1	F2	F3
Agree strongly	0.8441	0.8604	-0.2787
Agree	0.9426	0.8900	0.8707
Neither agree nor disagree	0.8525	0.7655	0.7027
Disagree strongly or disagree	0.5741	0.3371	0.7034

Although only one correlation exceeds 0.894, nine of twelve correlations exceed 0.70. This indicates strong within-group stability in terms of the three-factor structures but insufficiently strong to assert conclusively that, for each respondent group, random split-half three-factor structures are effectively the same as each other. The outcome of

within-group stability testing in Table 60 is consistent with the standard deviations for scale ratings presented in Table 50.

5.6.3 Similarity and stability of ‘democratisation’ interpretive frameworks

The two-factor interpretive framework for ‘democratisation’ is concluded to be stable for ‘all’ respondents based on the results of split-half reliability testing⁸⁴. Appendices 23, 24, 25 and 26 to this thesis present two-factor analyses for each of the ‘agree strongly’, ‘agree’, ‘neither agree nor disagree’, and ‘disagree strongly or disagree’ respondent groups respectively. Table 61 summarises the factors with which each scale correlates most strongly in each group. Group factor structures are thereby visually comparable.

Table 61: Comparative factor structures for the ‘democratisation’ concept

	All	Agree strongly	Agree	Neither agree nor disagree	Disagree strongly or disagree
First factor					
active-passive	F1	F2	F1	F1	F2
good-bad	F1	F1	F1	F1	F1
meaningful-meaningless	F1	F1	F1	F1	F1
visible-invisible	F1	F2	F1	F1	F1
real-imaginary	F1	F1	F1	F1	F1
positive-negative	F1	F1	F1	F1	F1
strong-weak	F1	F2	F1	F1	F1
timely-untimely	F1	F1	F1	F1	F1
vibrant-feeble	F1	F1	F1	F1	F1
Second factor					
successful-unsuccessful	F2	F2	F2	F1	F1
formed-formless	F2	F2	F2	F2	F2
society-individual	F2	F2	F2	F2	F2
certain-uncertain	F2	F2	F2	F1	F1
whole-partial	F2	F2	F2	F1	F2
complete-incomplete	F2	F2	F2	F2	F1

Comparability across all respondent groups is visually evident, particularly in relation to the first factor. With the exception of three scales for the ‘agree strongly’ respondents

⁸⁴See Table 27 in section 5.3.3.

and one scale for the ‘disagree strongly or disagree’ respondents, all first factor scales for ‘all’ respondents are also first factor scales for each of the respondent groups.

The second factor appears to be somewhat less homogenous, particularly in relation to ‘neither agree nor disagree’ and ‘disagree strongly or disagree’ respondents. For each of these respondent groups, three scales form part of the first rather than the second factor. Overall, the two-factor interpretive framework for ‘agree’ respondents appears to be very similar to that for ‘all’ respondents. The other respondent groups’ factor structures exhibit some scale differences.

Whereas a visual comparison of the two-factor structure of groups is helpful in terms of an initial overview, similarities and differences can also be investigated statistically. Table 62 sets out the correlations between factor scores for each group and ‘all’ respondents. It provides an indication of the extent to which the two-factor interpretive framework for ‘all’ respondents is representative of the factor structures for each respondent group.

Table 62: Correlations between factor scores for individual respondent groups and ‘all’ for two-factor ‘democratisation’ structures

Group	F1	F2	Respondents	%
Agree strongly	0.9870	0.9620	56	24%
Agree	0.9927	0.9949	112	48%
Agree strongly or agree	0.9965	0.9960	168	72%
Neither agree nor disagree	0.8911	0.6942	36	15%
Disagree strongly or disagree	0.7523	0.3360	30	13%
All			234	100%

As a majority of respondents ‘agree’ or ‘agree strongly’ with the substantive assertion, it is unsurprising that the two-factor structure of the combined ‘agree strongly or agree’ group correlates strongly with the two-factor structure for ‘all’ respondents. The strong

first factor correlations and slightly lower second factor correlations for both ‘neither agree nor disagree’ and ‘disagree strongly or disagree’ respondents are consistent with the visual comparative factor structures for these groups in Table 61.

As is the case with interpretations of both the ‘XBRL’ and ‘financial reporting’ concepts, the respondent group that appears to be least represented by ‘all’ respondents is the ‘disagree strongly or disagree’ group. The remaining groups constitute 87% of all respondents, which indicates a high degree of consensus regarding a two-factor interpretive framework for ‘democratisation’.

Table 63 sets out within-group correlations for each factor.

Table 63: Within-group correlations for ‘democratisation’ two-factor structures

Group	F1	F2
Agree strongly	0.7496	0.0486
Agree	0.7447	0.5043
Neither agree nor disagree	0.6189	0.5664
Disagree strongly or disagree	0.7221	0.6032

None of the correlations exceeds 0.894 although all except one exceed 0.50. This indicates reasonably strong within-group stability in terms of the two-factor structures. It is, however, insufficiently strong to assert conclusively that, for each respondent group, random split-half two-factor structures are effectively the same as each other. The outcome of within-group stability testing in Table 63 is consistent with the standard deviations for scale ratings presented in Table 53.

5.6.4 Conclusions on the similarity and stability of interpretive frameworks

The purpose of assessing the similarity and stability of the interpretive frameworks for each respondent group is to conclude (i) on the extent to which the interpretive

frameworks for ‘all’ respondents may be assumed to be representative of each respondent group, and (ii) whether the interpretive frameworks for each respondent group are as stable as is the case for ‘all’ respondents.

The interpretive frameworks for ‘all’ respondents appear to be highly representative of those of each respondent group with the exception of the ‘disagree strongly or disagree’ respondent group. For each concept, a majority of correlations exceed the threshold of 0.894. Although correlations are somewhat lower for ‘disagree strongly or disagree’ respondents, they are still above 0.50 in all but two cases. Furthermore, this respondent group comprises only 13% of total respondents. On this basis, it is concluded that the analyses undertaken in sections 5.4 and 5.5 are reasonable and valid.

Within-group interpretive framework stability for individual respondent groups is lower across all concepts. Although the majority of correlations would be ordinarily regarded as strong (in excess of 0.50), they are insufficiently strong to conclude epistemic objectivity. As such, there is further evidence in this section of the epistemic subjectivity identified in sections 5.4 and 5.5.

5.7 Tests for significant associations between responses to the substantive assertion and other categorical variables

The primary basis upon which respondents are categorised in this thesis is by reference to how the concepts in the substantive assertion are interpreted. The semantic differential survey instrument captures a number of additional categorical variables for assessing, which if any, may be significant in terms of being related to responses to the substantive assertion. The categorical information captured includes:

- (i) Geographical location of the survey respondent
- (ii) Capacity in which respondent works with XBRL
- (iii) Years of experience of working with XBRL
- (iv) Respondent gender
- (v) Respondent age group

There is some evidence that the geographical location of respondents and respondent gender are significant in terms of relating to responses to the substantive assertion. Table 64 presents a tabular analysis of responses to the substantive assertion by geographical location.

Table 64: Analysis of responses to the substantive assertion by geographical location

Geographical location ⁸⁵	Agree strongly	Agree	Neither agree nor disagree	Disagree strongly or disagree	Total	Number of respondents
USA/Canada/ Rest of Americas	27%	37%	20%	16%	100%	86
UK/Ireland	12%	63%	17%	8%	100%	52
Rest of Europe	21%	36%	24%	18%	100%	66
Asia/Australasia/ Africa	29%	53%	13%	4%	100%	45
All	22%	45%	19%	13%	100%	249

The percentages highlighted in red exceed the corresponding columnar percentage for ‘all’ respondents. A visual inspection of Table 64 suggests that ‘Americas’ respondents appear to be more likely to ‘agree strongly’ or ‘disagree strongly’ with the substantive assertion. In contrast, a comparatively low percentage of ‘agree strongly’ respondents come from ‘UK/Ireland’ and ‘Rest of Europe’. A relatively high percentage of ‘neither agree nor disagree’ and ‘disagree strongly or disagree’ respondents come from ‘Rest of

⁸⁵A number of the original categories are combined in order to meet the table cell requirements for statistical testing.

Europe’. Whereas 82% of ‘Asia/Australasia/Africa’ respondents either ‘agree strongly’ or ‘agree’ with the substantive assertion, only 57% of ‘Rest of Europe’ respondents can be categorised similarly.

The statistical significance of Table 64 is assessed by reference to Chi-square and Kruskal-Wallis testing. The Chi-square statistic for Table 64 is $X^2(9, N=249) = 18.735$, $p = 0.0275$. This provides statistical evidence that the geographical location of a survey respondent and responses to the substantive statement are significantly associated.

The outcome of the Kruskal-Wallis test on geographically categorised responses to the substantive assertion is presented in Table 65.

Table 65: Kruskal-Wallis test for significant relationship between geographical location and responses to the substantive assertion

Mean of summed ranks				
USA/Canada/ Rest of Americas	UK/Ireland	Rest of Europe	Asia/Australasia /Africa	p-value (two-tailed)
124.070	123.548	113.500	145.322	0.1124

The p-value of 0.1124 exceeds the benchmark value of 0.05 for rejecting the null hypothesis. The mean of summed ranks indicates that the greatest difference is between ‘Rest of Europe’ respondents and ‘Asia/Australasia/Africa’ respondents. Whereas this finding is consistent with the percentages included in Table 64, the Kruskal-Wallis test outcome indicates that it is not sufficiently significant to justify rejection of the null hypothesis of no significant difference between the categories of respondents. The Kruskal-Wallis test outcome does not provide sufficient statistical corroboration for the Chi-square test outcome. On this basis, any conclusion of a significant association

between geographical location and responses to the substantive assertion must be qualified⁸⁶.

Table 66 presents a tabular analysis of responses to the substantive assertion by gender.

Table 66: Analysis of responses to the substantive assertion by gender

Gender	Agree strongly	Agree	Neither agree nor disagree	Disagree strongly or disagree	Total	Number of respondents
Male	21%	47%	17%	15%	100%	210
Female	28%	38%	31%	3%	100%	39
All	22%	45%	19%	13%	100%	249

It appears that males are more likely to ‘agree’ or ‘disagree strongly or disagree’. Females predominantly ‘agree strongly’ or ‘neither agree nor disagree’. Only one female respondent explicitly disagrees with the substantive assertion. The Chi-square statistic for Table 66 is $X^2(3, N=249) = 8.136, p = 0.0433$. This suggests that there is a significant association between gender and response to the substantive assertion.

⁸⁶ANOVA testing for relationship between location and responses to the substantive assertion generated a p-value of 0.0792. Although a low p-value, it is insufficiently low to reject the null hypothesis and therefore supports the Kruskal-Wallis test outcome.

The outcome of the Kruskal-Wallis test on responses to the substantive assertion categorised by gender is presented in Table 67.

Table 67: Kruskal-Wallis test for significant relationship between gender and responses to the substantive assertion

Mean of summed ranks		
Male	Female	p-value (two-tailed)
123.498	133.090	0.4174

The Kruskal-Wallis outcome (p-value =0.4174) does not indicate a significant relationship between gender and responses to the substantive assertion. The mean of summed ranks and resultant p-value both suggest that male and female respondents are from the same population. As is the case for the geographical analysis of responses to the substantive assertion, a relationship between gender and responses to the substantive assertion is evident based on Chi-square testing but is not supported by the outcome of Kruskal-Wallis testing⁸⁷.

In relation to (i) the capacity in which respondents work with XBRL, (ii) respondent years of experience, and (iii) respondent age group, there is no statistical evidence of significant relationships between responses to the substantive assertion and any of these categorical variables. None of the p-values for any of Chi-square, Kruskal-Wallis or ANOVA approaches the 0.05 threshold. Tabular analyses of responses to the substantive assertion for each of these categorical variables are included as Appendix 27 to this thesis.

⁸⁷ANOVA testing for relationship between gender and responses to the substantive assertion generated a p-value of 0.222. This outcome supports the Kruskal-Wallis test result.

To conclude on the categorical analysis, there is some visual and statistical evidence that the geographic location and gender of respondents may be significant variables. The statistical evidence is, however, insufficiently strong to conclude with any certainty. Regarding the capacity in which respondents work with XBRL, respondent years of experience of working with XBRL and the age group of respondents, none appears to be significant in terms of making a difference to responses to the substantive assertion.

In comparison to the outcomes of sections 5.4 and 5.5, geographical location, gender, age, experience and capacity in which respondents work with XBRL are less significant in terms of being related to responses to the substantive assertion. It is concluded that respondent interpretations of concepts included in the substantive assertion are more insightful than the other categorical variables included in the survey.

5.8 Tests for significant associations between respondent factor scores and other categorical variables

Although there is no compelling evidence to suggest that responses to the substantive assertion are significantly associated with the other categorical variables included in the survey, this section considers the possibility that interpretations of the individual concepts may be significantly associated with one or more of the other categorical variables.

For each concept, quartile scores for each factor are grouped by each of the other categorical variables. Thus, each respondent's factor score is categorised according to the quartile into which it falls and according to the other relevant variable. The

statistical significance of the resultant contingency tables is assessed by reference to Chi-square testing. A summary of the test outcomes are presented in Table 68.

Table 68: Summary of whether factor scores for each concept are significantly associated with other categorical variables

	Geography	Capacity	Experience	Gender	Age
XBRL					
utility	yes	no	no	no	no
usability	no	no	yes	no	no
availability	yes	no	no	no	no
Financial reporting					
integrity	no	no	no	no	no
flexibility	no	no	no	no	no
complexity	no	no	no	no	no
Democratisation					
positivity	no	no	no	no	no
completeness	no	no	no	no	no

The outcome of the Chi-square testing indicates that there is a significant association between the geographical location of respondents and each of the XBRL utility and availability factor scores. There is also a significant association between the XBRL usability factor and respondent years of experience of XBRL. No other significant associations between factor scores and other categorical variables were evident.

Table 69 categories the XBRL utility factor scores by geographical location of the respondents.

Table 69: Analysis of XBRL utility factor scores by geographical location

	USA/ Canada/ Rest of Americas	UK/ Ireland	Rest of Europe	Asia/ Australasia/ Africa	Total	Number of respondents
Quartile 1	41%	25%	32%	2%	100%	63
Quartile 2	31%	26%	18%	26%	100%	62
Quartile 3	31%	24%	29%	16%	100%	62
Quartile 4	35%	8%	27%	29%	100%	62
All	35%	21%	27%	18%	100%	249

The percentages highlighted in red exceed the corresponding columnar percentage for ‘all’ respondents. The Chi-Square test statistic for Table 69 is $X^2(9, N=249) = 26.319$, $p < 0.0018$. A visual inspection indicates that ‘Americas’ respondents are more likely to score the utility of XBRL in the first or fourth quartiles. Only 8% of ‘UK/Ireland’ respondents scored in the fourth quartile whereas only 2% of Asia/Australasia/Africa respondents scored in the first quartile. The pattern of factor scores is consistent with the pattern of responses to the substantive assertion by geographical location presented in Table 64. This suggests that perceptions of the utility of XBRL differed by geographical location and was influential in terms of responses to the substantive assertion.

Table 70 categories the XBRL utility factor scores by geographical location of the respondents.

Table 70: Analysis of XBRL availability factor scores by geographical location

	USA/Canada /Rest of Americas	UK/ Ireland	Rest of Europe	Asia/ Australasia/ Africa	Total	Number of respondents
Quartile 1	35%	32%	16%	17%	100%	63
Quartile 2	29%	23%	34%	15%	100%	62
Quartile 3	35%	26%	19%	19%	100%	62
Quartile 4	39%	3%	37%	21%	100%	62
All	35%	21%	27%	18%	100%	249

The percentages highlighted in red exceed the corresponding columnar percentage for ‘all’ respondents. The Chi-Square test statistic for Table 70 is $X^2(9, N=249) = 23.063$, $p < 0.0061$. It is evident that ‘UK/Ireland’ respondents have a low representation in the fourth quartile in comparison to all other geographical categories, particularly the ‘Rest of Europe’ respondents, many of whom are included in the fourth quartile. It is apparent that XBRL is not perceived to be as available to ‘UK/Ireland’ respondents as it is to others. Table 40⁸⁸ did not reveal a statistically significant relationship between the availability of XBRL and responses to the substantive assertion (the p-value for Table 40 was 0.1796). The difference in perception of the availability of XBRL between ‘UK/Ireland’ and other respondents may have had some influence on responses to the substantive assertion but not to the extent that it was statistically significant.

⁸⁸ Categorisation of responses to the substantive assertion by XBRL availability factor scores

Table 71 categories the XBRL utility factor scores by geographical location of the respondents.

Table 71: Analysis of XBRL usability factor scores by years of experience

	<2	>2 and <4	>4 and <6	>6 and <8	>8	Total	Number of respondents
Quartile 1	17%	21%	22%	5%	35%	100%	63
Quartile 2	23%	24%	21%	18%	15%	100%	62
Quartile 3	24%	24%	21%	16%	15%	100%	62
Quartile 4	24%	27%	29%	10%	10%	100%	62
All	22%	24%	23%	12%	18%	100%	249

The percentages highlighted in red exceed the corresponding columnar percentage for ‘all’ respondents. The Chi-Square test statistic for Table X is $X^2(12, N=249) = 21.123$, $p < 0.0486$. It is evident that a relatively high percentage of respondents with more than eight years of experience of XBRL are in the first quartile of factor scores for the availability of XBRL. Respondents with fewer years of experience appear to be more likely to be included in the third and fourth quartile of factor scores. These findings suggest that more experienced respondents may have a greater appreciation of the practical challenges associated with implementing XBRL technologies.

5.9 Conclusions

Does XBRL democratise financial reporting? The substantive assertion that ‘XBRL democratises financial reporting’ is, in Rorty’s (1989) terms, a metaphoric re-description of the social reality of financial reporting. In Searle’s (1995) terms, the substantive assertion is a potential institutional fact. Whether it is accepted as a metaphoric re-description of financial reporting and as an institutional fact requires a collective consensus that financial reporting is democratised by XBRL. The collective consensus is assessed by reference to both (i) the extent of agreement with the

substantive assertion, and (ii) sufficient evidence that the concepts included in the substantive assertion are epistemically objective. In short, the question is whether (i) there is sufficient agreement with the substantive assertion, and (ii) it is reasonable to conclude that the concepts included in the substantive assertion may be regarded as epistemically objective.

Sixty-seven percent of respondents ‘agree strongly’ or ‘agree’ that ‘XBRL democratises financial reporting’. Only 13% ‘disagree’ or ‘disagree strongly’ with the substantive assertion. Factor analysis of each of the concepts included in the substantive assertion for ‘all’ respondents generates stable multi-factorial interpretive frameworks. On this basis, it is possible to argue the epistemic objectivity of ‘XBRL democratises financial reporting’. In other words, it is possible to claim, at this level of analysis, that the substantive assertion is a new institutional fact.

However, when connotative interpretations of the concepts are categorised by reference to responses to the substantive assertion, interpretive differences within and between respondent groups emerge. As such, the apparent consensus does not withstand comparison of underlying interpretations within and between respondent groups.

At the detailed level of analysis, each of ‘XBRL’, ‘financial reporting’ and ‘democratisation’ are concluded to be epistemically subjective. These conclusions are based on the (i) existence of significant associations between respondent factor scores and responses to the substantive assertion and (ii) absence of sufficient within-group stability of the interpretive frameworks for each concept. Statistically significant relationships between factor scores and responses to the substantive assertion imply that responses to the substantive assertion are conditioned by interpretations of the concepts.

If each respondent group interprets the concepts in the same way, no significant association should arise. Furthermore, within-group split half correlations fall below the 0.894 threshold for concluding epistemic objectivity in several instances. This finding indicates that statistically significant differences in interpretations within individual respondent groups are present. Thus, the overall conclusion drawn is that the epistemic subjectivity of each of 'XBRL', 'financial reporting' and 'democratisation' cannot be disregarded.

While the epistemic subjectivity of the concepts included in the substantive assertion must be acknowledged, it is appropriate to acknowledge the strength of many of the split-half correlations. Although some do not exceed the benchmark 0.894, many exceed the 0.50 value that is commonly regarded as a threshold for a strong statistical relationship. The strong correlations returned throughout the analysis and the extent to which stable two- and three-factor interpretive frameworks for 'all' respondents are representative of the interpretive structures of each respondent group confirm a substantial common interpretive basis among respondents. However, notwithstanding strong correlations, the rejection of epistemic subjectivity requires very strong split-half correlations that may be achieved only as XBRL technologies mature over time.

Categorising respondents according to interpretations of concepts appears to be the most revealing categorical variable included in the analysis. None of the other categorical variables (location, gender, experience, nature of exposure to XBRL or age) indicated relationships of comparable significance. Although the process of categorising respondents according to interpretations has a subjective element, the semantic

differential instrument is amenable to continuous development in terms of the inclusion of the most appropriate scales and adjectives.

Chapter Six concludes on the objectives, outcomes and value of this thesis.

6.1 Introduction

The purpose of this chapter is to draw out the implications of the analysis in Chapter Five for the substantive research question and for the wider considerations that are set out in Chapter One. The motivations for this thesis are the areas of weakness⁸⁹ in AIS research noted by Sutton (1992) and Xiao, et al., (1996), evidence of a continuation of those weaknesses in relation to IFR and XBRL technologies, and a predominance of research investigating financial reporting technologies that is justified by contestable rhetoric. This thesis exemplifies the design and implementation of a research approach that contributes to addressing the limitations of accounting research with regard to emerging financial reporting technologies.

The position taken in this thesis is that financial accounting researchers adopt 'black box' realist perspectives a little too enthusiastically in relation to emergent technologies. The potential for diverse social meanings is insufficiently explored. Some accounting researchers who concern themselves with emerging financial reporting technologies rely excessively on a superficial understanding of the technology and a rhetoric that is commonly associated with new technologies in order to justify research studies. Implicit assumptions of ontological and epistemic objectivism, simple linear relationships and static analyses of the 'impacts' of new technology have not contributed significantly to financial reporting theory or practice. It appears contradictory to assert the democratisation of financial reporting or

⁸⁹(i) an almost total absence of theory, (ii) a focus on descriptive studies of practice and (iii) limited analysis of data yielding little insight into meaningful relationships.

revolutionary/paradigmatic changes to the practice of financial reporting yet for the apparent agent of change to contribute so little to the richness of either descriptive or prescriptive accounting theory.

As is evident in this thesis, facilitating the contingency of meaning provides insights to perceptions of concepts that may not otherwise be revealed. This thesis presents the democratisation of financial reporting as a potential metaphoric re-description of financial reporting that arises due to the emergence of XBRL technologies. As such, it is considered a testable hypothesis rather than accepted as truth. The truth of the matter is assessed by reference to whether the democratisation of financial reporting is an institutional fact. In this thesis, the existence of an institutional fact requires both (i) agreement with the substantive assertion and (ii) confirmation of the epistemic objectivity of the concepts included in the substantive assertion. Thus, the research explicitly considers the possibility that meanings of concepts may be contingent upon individual experiences and attitudes and, as a result, may not be epistemically objective.

Addressing the contingency of meaning that may be inherent in concepts such as 'democratisation' presents significant challenges in terms of operationalising the research. Chapter Two illustrates how the meaning of concepts can change over time and space. However, incorporating Osgood, et al.,'s (1957) semantic differential technique can facilitate the interpretation of potentially subjective concepts in the design of the research, and comparison thereof, without compromising the rigour required of academic research.

This chapter proceeds with conclusions on the specifics of the research question and implication for similar research problems. XBRL may be considered one example of emerging financial reporting technologies and ‘democratisation’ illustrative of the types of rhetoric typically associated with them. The contextual basis of what can appear, at first glance, to be a simple majority confirmation that ‘XBRL democratises financial reporting’ is highlighted.

In terms of contributions to financial reporting and XBRL knowledge, the significance of the empirical findings, in terms of the similarities and differences in interpretations, is set out. The innovative application of the semantic differential is also highlighted. The chapter concludes with an acknowledgement of the research limitations and opportunities for further research that arise from the outcomes of this thesis.

6.2 Conclusions on the substantive research question

The analysis and findings presented in Chapter Five indicate that the majority of respondents agree with the assertion that ‘XBRL democratises financial reporting’. Notwithstanding stable interpretive frameworks for each of the constituent concepts when all respondents are considered together, there is insufficient consensus among respondents as to their interpretations. Thus, it is concluded that respondents are not agreeing and disagreeing about the same phenomena. Consequently, it is premature to make unqualified assertions that ‘XBRL democratises financial reporting’. Rather, it is necessary to understand the underlying differences in perceptions among XBRL and financial reporting stakeholders.

Interpretations of ‘XBRL’ in terms of its utility and usability provide a link to innovation and technology acceptance research. Consistent with the findings of that body of research, the utility and usability of XBRL are perceived as its most significant factors among survey respondents. It is evident that there is a lot of optimism about the utility of XBRL. The semantic differential ratings are consistently towards the ‘positive’ ends of the utility scales, even among respondents who disagree with the substantive assertion⁹⁰.

The XBRL utility ratings appear to be a primary reason why 67% of respondents agree with the substantive assertion and why only 13% explicitly disagree. Furthermore, it could be argued that these utility ratings support the rhetoric of democratisation that is noted in literature. However, the usability and availability of XBRL are two significant factors that reveal the differences between XBRL technologies as abstract concepts and XBRL as a successfully implemented component of a financial reporting system. It is clear that the usability of XBRL, as measured by ratings for the ‘*complex-simple*’, ‘*difficult-easy*’, ‘*obscure-clear*’ and ‘*cumbersome-usable*’ scales is an issue for many respondents. The average ratings for these scales are among the lowest of any scale and the standard deviations are among the highest. Similarly, an analysis of the availability scales reveals averages and standard deviations that confirm a range of perceptions regarding the practical availability of XBRL.

Regarding ‘financial reporting’, the statistical analysis indicates a greater degree of consensus across the respondent groups in comparison to the ‘XBRL’ concept. It

⁹⁰The lowest average rating for scales that constitute the utility factor among respondents who disagree with the substantive assertion is 4.09. The corresponding average for ‘all’ respondents is 5.00. See Table 46 in section 5.5.1.

appears, therefore, that agreement or disagreement with the substantive assertion is not related specifically to interpretations of 'financial reporting'. No significant between-group differences are evident at factor or scale level.

Perhaps the most interesting outcome in relation to 'financial reporting' is the within-group difference attributable to 'agree strongly' respondents in Table 41. Some 'agree strongly' respondents rate 'financial reporting' poorly in terms of its integrity whereas other 'agree strongly' respondents rate it highly. This outcome illustrates how respondents, while they may be categorised together based on their responses to the substantive assertion, may have different reasons for their responses. It also illustrates that perceptions of financial reporting may be changing because of the emergence of XBRL. For example, respondents who previously considered financial reporting as reliable, reputable, honest and adequate may no longer perceive financial reporting in these terms if XBRL technologies are not component parts of financial reporting. As such, perceptions of what constitutes financial reporting may be destabilised by the emergence of XBRL.

In the case of 'democratisation', the derived interpretive framework is stable for two factors only. A two-factor interpretive framework indicates that participants perceive the concept in simpler terms in comparison to the three-factor frameworks for 'XBRL' and 'financial reporting'. In order for an interpretation of 'democratisation' for 'all' respondents to be stable, it must be underpinned by scales such as '*good-bad*', '*positive-negative*', '*strong-weak*' and '*successful-unsuccessful*'. The inclusion of other scales, such as '*public-private*', '*individual-society*' or '*enhanced accountability-reduced accountability*', that could perhaps provide greater insight to perceptions of democracy

and democratisation, result in unstable interpretive frameworks and/or return comparatively low communality coefficients.

It is unsurprising that the interpretive framework for ‘democratisation’ is stable for only two factors. ‘Democratisation’ is not a concept that would commonly feature in technical financial reporting or XBRL vocabularies. However, for ‘democratisation’ to be meaningful in any given context, there must be a consensus at some level as to its meaning. In the case of this thesis, there is little evidence of a consensus other than in the simplest of adjectival terms. Furthermore, of the fifteen respondents who expressed no interpretation of ‘democratisation’ in the survey⁹¹, twelve were ‘neither agree nor disagree’ respondents. These respondents appear to have declined to agree or disagree with the substantive assertion on the logical basis of being unable or unwilling to interpret ‘democratisation’. These findings illustrate the evident challenge of interpreting concepts such as democratisation in a meaningful way.

The contingency of democracy is set out in Chapter Two. However, the interplay between the individual and society, the public and private spheres, the possibilities of teledemocracy or enhanced accountability do not appear to feature significantly or consistently in the perceptions of survey respondents. The literature in Chapter Two also refers to weak and strong forms of democracy (Mouck, 1994). Recall that strong democracy facilitates greater participation in society, does not depend on economic power and enables current paradigms to be linguistically challenged and re-described. As such, Mouck’s (1994) strong democracy resonates strongly with Searle’s (1995)

⁹¹These respondents selected the mid-point on every semantic differential scale associated with the ‘democratisation’ concept. See also section 5.3.3.

potential institutional facts, Rorty's (1989) metaphoric re-descriptions, Habermas' discursively achieved consensus and the interpretive flexibility of SSK. Perhaps a progression from weaker to stronger democracy is the social outcome believed by those who challenge the existing financial reporting paradigm and assert a democratisation of financial reporting. If so, their re-description of financial reporting as democratised because of XBRL is itself linguistically challenged in this thesis. The primary outcome is that there is insufficient evidence, to support assertions of the democratisation of financial reporting.

While there is insufficient evidence to conclude epistemic objectivity (and hence the existence of a new institutional fact), there is evidence to support some commonality of interpretations. In particular, based on the factor analyses of scale ratings, the interpretive frameworks for each concept for 'all' respondents are concluded to be stable. Over time, as and when XBRL technologies may be implemented on a greater scale, there is the possibility that the correlations calculated to assess epistemic objectivity may approach the 0.894 threshold. However, until the epistemic objectivity of an assertion such as 'XBRL democratises financial reporting' is demonstrated, its epistemic subjectivity should not be disregarded.

In conclusion, in the absence of stable and meaningful interpretations, the potential exists for rhetorical assertions such as 'XBRL democratises financial reporting' to be ultimately worthless. The evidence of epistemic subjectivity supports an argument that accounting research of new technologies needs to be based on more than a rhetoric of democratisation and hard technological determinism. Section 2.5 of Chapter Two cites accounting research articles that rely on the rhetoric that is commonly associated with

new computing and telecommunication technologies. Thus, accounting literature may be criticised based on perceptions of an emerging accounting technology as a simplistic black-box phenomenon and over-simplifying the relationship between financial reporting and technology. These findings are consistent with and support the conclusions of Sutton (1992) and Xiao, et al., (1996) in relation to earlier technological developments.

6.3 Implications for the research problem

Emergent technologies, such as XBRL, have the potential to affect the nature and purpose of financial reporting in terms of its role in discharging accountability. New technologies naturally attract the attention of accounting researchers who investigate how the processes and outcomes of financial reporting may be affected by new technologies. However, the findings of this thesis reinforce those of Sutton (1992) and Xiao, et al., (1996): the relationship between financial reporting and computing/telecommunications technologies is over-simplified in accounting research. The emergence of a new technology such as XBRL should perhaps prompt a re-consideration of what financial reporting should be rather than implicitly assuming that XBRL is designed to fit financial reporting and the existing financial reporting phenomenon will be, somehow, just better as a result. There is evidence in this thesis to suggest that ‘agree strongly’ respondent perceptions of financial reporting may have changed because of the emergence of XBRL. Thus, the possibility that perceptions of financial reporting may be disrupted by XBRL should be considered. In short, the relationship between financial reporting and XBRL is a two-way street.

This thesis goes beyond confirming the conclusions of Sutton (1992) and Xiao, et al., (1996). It posits that the research methodologies and methods commonly adopted in accounting research may not fit the stage of development of emergent technologies. The predominance of positivism and the popularity of descriptive research are based on presumptions that new technologies are more mature and embedded within financial reporting than may be the case. Researchers attempt to gain rhetorical advantage by referring to revolutionary change, paradigm shifts and, of course, democratisation. However, there is a disconnect between the stage of development of emerging technologies and the research methodologies employed to investigate dynamic and embryonic relationships. Researchers refer to potential revolution but undertake research on the assumption that the revolution has already occurred.

It is acknowledged that descriptive research has its place as part of the development of an emergent body of knowledge but something more is required if meaningful contributions to the development of theory and practice are expected. In this thesis, the contingencies of social reality are explicitly recognised and accepted as a research challenge. A research methodology that is appropriate to the stage of development of the technology is applied. Whereas positivist research is suited to research settings in which the variables are established and largely uncontested, an interpretive perspective is considered the appropriate choice in this thesis. An interpretive perspective is appropriate in dynamic and possibly complex social settings in which variables and relationships remain unstable.

At the emergent stage of development, numerous aspects of a technology and claims relating to it may be subjective. The methodology and method adopted are effective for

eliciting meanings that may be attached to subjective concepts in a way that makes them amenable to analysis. Whereas 'XBRL democratises financial reporting' is the substantive claim that is investigated in this thesis, the approach taken to investigating this particular assertion can be applied to similar claims in respect of other technological developments. As such, the truth of revolutionary changes and paradigmatic shifts in financial reporting, as understood in a social reality, can be assessed. Thus, research questions become amenable to intellectual investigation in a meaningful way and assertions such as 'XBRL democratises financial reporting' are regarded, within an interpretive research framework, as a testable hypothesis rather than accepted as a rhetorical truth.

Chapter Three refers to Orlikowski and Baroudi's (1991) 'weak constructionist' perspective as an accurate description of the research approach adopted in this thesis: *'interpretive research is understood to complement positivist research, that is, by generating hypotheses for further investigation, and by filling in the knowledge gaps that positivist research cannot attend to, such as the contextual exigencies, the meaning systems, and the interaction of various components of a system...The current positivist perspective has insufficient variety for the nature of the phenomena investigated by information systems researchers'*. Although this thesis concludes that the concepts included in the substantive assertion are epistemically subjective, the interpretive approach and related methods provide the tools to monitor the epistemic status of concepts over time. The point at which concepts may become sufficiently objective to be amenable to positivist research is thereby identifiable. Furthermore, questions arising from the outcomes of this thesis such as the reasons why respondents interpret

concepts in particular ways or eliciting views on how concepts are generally interpreted may be more effectively pursued within a positivist research framework.

Respondent perceptions of 'XBRL' in particular terms of utility and usability reinforce the relevance of innovation and technology acceptance literature to accounting research of new technologies such as XBRL. The disruptive nature of technologies and the possibility that they mature in ways other than originally envisaged are aspects of innovation and technology acceptance literature that could usefully be considered in the context of the development of financial reporting.

Overall, a key conclusion of this thesis is that accounting research must evolve from an understanding of the subject domain rather than the mere availability of a new technology. Understanding a new technology domain may require acknowledgement of the existence of subjectivity: a concept can mean different things to different people at different points in time. The approach adopted in this thesis facilitates the dynamic nature of new technologies. It can be incorporated into accounting research projects that involve the investigation of other emerging technologies.

6.4 Contributions to the body of knowledge

The motivation for this thesis stems from: (i) the potential of XBRL to make a significant difference to the theory and practice of financial reporting, and (ii) the problematic aspects of accounting research of IT highlighted by Sutton (1992) and Xiao, et al., (1996) in terms of an excessive focus on descriptive-type research, the absence of theoretical considerations and little insight into meaningful relationships between variables. The disconnect between the rhetoric and the social reality of

financial reporting IT is the gap in research knowledge that is of interest. XBRL provides the research opportunity to investigate how emerging financial reporting technologies may be researched within an interpretive framework.

This thesis highlights the necessity of incorporating appropriate research methodology into the overall research design. In this thesis, an interpretive perspective is argued to be the appropriate methodology given the stage of development of the technology under investigation. The interpretive approach is applied by means of Osgood, et al.'s (1957) semantic differential. The semantic differential, as a measure of meaning, is particularly apposite to interpretive research because of the significance of meaning during emergent stages of technological development. Thus, an innovative application of the semantic differential tool facilitates methodical comparison of concepts and is, thereby, able to identify statistically significant differences in the interpretations held by interested parties. In the absence of such, there may be inaccurate conclusions regarding the truth of the substantive assertion.

The outcomes of the analysis include multi-factorial interpretations of each of the concepts included in the substantive assertion. Consistent with semantic differential theory, stable three-factor connotative interpretive structures of 'XBRL' and 'financial reporting' for 'all' respondents can be derived. This is the first application of the semantic differential to the 'XBRL' technological domain. The factors that constitute that interpretive framework of 'XBRL', utility, usability and availability, are similar to those identified in innovation and technology acceptance research as significant in terms of the acceptance or rejection of new technologies. This suggests that XBRL accounting research could perhaps be more usefully undertaken with reference to its

utility and usefulness rather than somewhat vague notions of its democratising capabilities.

The three-factor interpretations of ‘financial reporting’ for each respondent group do not reveal the between-group differences that are evident for ‘XBRL’. Respondents appear to perceive it in similar terms across respondent groups. In comparison to the newness of ‘XBRL’, for which the avid enthusiasm of ‘agree strongly’ respondents is statistically evident, the absence of between-group differences for ‘financial reporting’ is perhaps unsurprising given its comparative maturity as a concept. The more interesting ‘financial reporting’ outcome is how perceptions may be disrupted by the introduction of a new technology.

With regard to the potential of XBRL to make a significant difference to financial reporting theory and practice, the findings of this thesis suggest that it is unhelpful to express the realisation of its potential in terms of ‘democratising’ financial reporting. The absence of a consensus as to the meaning of ‘democratisation’, other than being a generally positive phenomenon, means that the specifics of how financial reporting is affected by ‘democratisation’ remain very much a subjective matter.

While the application of the semantic differential in this thesis is not its first application to accounting or financial reporting⁹², it is its first application to technological aspects of financial reporting. Furthermore, whereas prior accounting studies investigate the meanings of individual concepts and the extent to which they are shared, this thesis goes

⁹²See section 3.7.

further to apply the outcomes of the semantic differential analyses to draw conclusions about a specific research question. As such, the application of the semantic differential techniques in this thesis is a means to an end rather than an end in itself.

The successful application of an interpretive research framework paves the way for positivist and critical research. Positivist-oriented research is most appropriate to investigations of phenomena for which variables and definitions are established and, in epistemic terms, are objective. Enhanced understandings of phenomena and identification of the extent to which interpretations are shared provide a more reliable research basis than is the case when such research must rely on vague and unsupported notions of revolutionary change or democratisation. Although the statistical split-half reliability threshold for concluding epistemic objectivity in this thesis is 0.894, it is not suggested that this threshold must be exceeded before commencing positivist-oriented research. It is acknowledged that 0.894 is a demanding threshold that, for many dynamic concepts, may never be exceeded. The conclusion of this thesis is that, while positivist research can be undertaken successfully in tandem with interpretive-type work, the epistemic status of variables and concepts may need to be qualified.

This thesis exemplifies an effective combination of qualitative and quantitative analyses. The concepts included in the substantive assertion are interpreted by reference to factor analysis (quantitative) in order to identify significant scales that cluster together. Attempting to make sense of clustering scales and attaching labels to them is the qualitative aspect of the analysis. Thus, the concepts are qualitatively interpreted but complemented by appropriate statistical analysis. Statistical analyses that are conventionally associated with scientific research methods can be effectively

utilised within an interpretive research framework. One advantage is that the data may be analysed directly by a reader, thereby enabling the adequacy of interpretations to be assessed and alternative interpretations drawn out if deemed necessary. Thus, an ability to compare and contrast interpretations is retained when qualitative and quantitative analyses are effectively combined.

In short, the primary contribution of this thesis is to investigate the interpretations of concepts, the meanings of which may be dynamic in nature, in order to conclude on the extent to which interpretations are shared at a point in time. The emergent stage of XBRL and the contingent nature of democracy preclude assumptions of epistemic objectivity. Although a majority of respondents profess to agree with the substantive assertion that 'XBRL democratises financial reporting', the analysis indicates that respondents do not share interpretations of the constituent concepts. Thus, they do not appear to be agreeing and disagreeing about the same phenomena, and particularly the meaning of 'democratisation'. This thesis indicates, therefore, that assumptions regarding the epistemic objectivity of contingent concepts may result in premature or meaningless conclusions regarding the truth of assertions such as 'XBRL democratises financial reporting'.

The second significant contribution is to illustrate how the asserted potential of new financial reporting technologies can be investigated within a research framework that is appropriate to the stage of development of the technology. Subjective rhetorical claims can be methodically assessed and accepted or rejected. Consequently, the potential of new financial reporting technologies can be researched meaningfully and contributions to financial reporting theory and practice enhanced.

6.5 Research limitations

Research limitations may be a deliberate part of the research design from the outset. For example, a study may be delimited in terms of industry or geographic location. However, additional matters may arise during data collection or analysis that necessarily limits the scope or strength of the conclusions drawn. In the case of this thesis, deliberate research delimitations relate to the population from which the sample of survey participants is selected and the particular type of meanings elicited from survey participants. Recall that the requirement of survey participants is knowledge of XBRL. Consequently, the sample is a non-probability sample and the generalisability of the findings is restricted. However, in the case of this thesis, this particular delimitation is not regarded as problematic because the data collection objective (rich interpretations of XBRL) is served better by a judgmentally selected sample.

In relation to survey participants, it is acknowledged that some respondents may have been motivated to respond in a particular way because of commercial interests in the development of XBRL technologies. The research preference to include as many XBRL-knowledgeable individuals as possible resulted in the inclusion of some who have a business interest in XBRL. However, there were no statistical indications that respondents who develop software or act as business consultants were any more likely to 'agree strongly' that 'XBRL democratises financial reporting' than any other category of respondent. Nevertheless, as XBRL technologies mature, research studies may have opportunities to use probability samples and/or include greater numbers of end-users of XBRL in research samples. The possibility of potential response bias

associated with respondents who have a vested commercial interest in advocating XBRL can be thereby mitigated.

In relation to the particular type of meanings elicited from survey participants, Osgood, et al., (1957, p.2) states: *'There are at least as many meanings of 'meaning' as there are disciplines which deal with language, and of course, many more than this because exponents within disciplines do not always agree with each other'*. The particular type of meaning referred to in this thesis is connotative meaning. However, it is not suggested that connotative meaning is the only type of meaning than can be investigated. For example, Oliver (1974, p.313) refers to syntax, lexicology and context as important facets of communication and language. The conclusions in this thesis are drawn based on investigations of connotative interpretations only.

The adoption of the interpretive approach in this thesis raises the research issue of rigour versus relevance. Research conducted within a positivist framework is conventionally perceived to be stronger on rigour whereas interpretive research is conventionally thought of as more relevant to practice due to a contextual grounding (Khazanchi & Munkvold, 2002). Advocates of positivism may not be convinced of the usefulness of an interpretive research framework but disagreement at this level is ultimately an indeterminate philosophical matter. This thesis is positioned in terms of complementing positivist-type research and, as such, its relevance and rigour is not presented in terms of being one or the other. The research framework that is considered by the researcher to be most appropriate to the relevant research problem is applied with due rigour.

Regarding the semantic differential and factor analysis of scale ratings, the method is not without its critics. Thompson (2004, p.6) summarises the essence of the criticism with a degree of irony as follows: *'apparently it is so easy to find semantic scales which seem relevant to [information] sources, so easy to name or describe potential/hypothetical sources, so easy to capture college students to use the scales to rate the sources, so easy to submit those ratings to factor analysis, so much fun to name the factors when one's research assistant returns with the computer printout, and so rewarding to have a guaranteed publication with no fear of non-significant results that researchers, once exposed to the pleasures of the factor analytic approach, rapidly become addicted to it'*. Furthermore, criticism of the semantic differential and factor analysis resonates most strongly in a positivist research framework in which subjective assessments on the part of a researcher is regarded as problematic. This thesis, however, is undertaken within an interpretive research framework in which the researcher fulfils an interpretive role. The researcher is assumed to be, as Laughlin (1995) states, *'free thinking and variable in perceptual skills and, rather than seeing this as a problem, it is built upon as a [research] strength'*. As such, the semantic differential and factor analysis techniques are regarded as a particularly good complementary fit because they enhance the rigour of data collection and analysis and lend statistical weight to the interpretations.

Ultimately, the quality of the interpretations of concepts depends fundamentally on the relevance of the adjectival scales included in the semantic differential data collection instrument. The scales constrain the survey participants in terms of the semantic boundaries within which they must express interpretations of concepts. Thus, the data collection instrument can be effective only to the extent that it captures the breadth of

interpretations that participants may hold. If scales do not map the full semantic space applicable to a concept, then accurate interpretations of concepts may not emerge. The percentages of variance captured within the three-factor analyses of 'XBRL' and 'financial reporting' are 59.992% (Table 25) and 49.886% (Table 26) respectively. The percentage of variance captured by the two-factor analysis of 'democratisation' is 46.332% (Table 27). The equivalent percentages for the pilot study are 60.102% (Table 14), 58.162% (Table 12) and 48.887% (Table 16) respectively. While these percentages compare favourably with those obtained by Osgood, et al., (1957, p.38) and in accounting studies that have utilised the semantic differential, higher percentages are nevertheless desirable. Higher percentages indicate that a greater proportion of an interpretation is reflected in the first two or three factors. They are achievable when the scales in a semantic differential instrument correspond more precisely to the adjectives respondents would use to interpret a concept. In such cases, the stability of the interpretive framework is also likely to be enhanced. The communality coefficients included in Tables 25, 26 and 27 confirm that some scales included in the semantic differential instrument in this thesis are more useful than others. It is acknowledged that there is scope for refinement of the data collection instrument.

6.6 Research opportunities

One of the strengths of this thesis is that it provides a basis for subsequent research. As XBRL is an emerging technology, there are ample research opportunities that arise from the ongoing maturation of XBRL and from practical implementations thereof. Moreover, research opportunities generally arise from the removal or management of research limitations.

Perhaps the most obvious research opportunity is a longitudinal analysis of the concepts included in this thesis. This research paradigm accepts the changing nature of society and therefore looks to utilise research instruments that handle the dynamic nature of reality. Interpretations of reality may shift over time as circumstances, objectives and constituencies change. The type of research undertaken here can complement simultaneous empirical work. The possibility of progression from epistemic subjectivity to objectivity could be a useful measure of the development of XBRL and, at the point at which epistemic objectivity is reasonably arguable, provide a justification for positivist oriented accounting research.

As noted in the research limitations section, the pre-requisite of XBRL knowledge for this thesis necessarily results in the utilisation of a non-probability sample. This thesis is based on a purposive sample of participants, which for ensuring a sufficiently large sample, was not constrained in terms of, for example, geography, technical background or particular type of interest in XBRL. If implementations of XBRL technologies become more widespread, there will be opportunities to undertake similar research with a focus, for example, on accountants, software developers, recipients or preparers of XBRL files or particular geographic locations. A larger population of XBRL-knowledgeable individuals also increases the possibility of probability samples and generalisability of the findings.

The number of responses to the survey constrained the statistical work in terms of the depth of analysis. The thesis includes assessments of whether (i) interpretations of concepts are associated with responses to the substantive assertion, (ii) other categorical variables are associated with responses to the substantive assertion, and (iii)

interpretations of concepts are associated with other categorical variables. A greater number of responses is required, for example, to analyse reliably the interpretations of concepts by reference to the other categorical variables and then test for associations with responses to the substantive assertion. Minimum cell value requirement for statistical testing preclude this possibility in this thesis. The opportunity to undertake additional statistical work will become possible as XBRL technologies mature.

In relation to the research method, it must be acknowledged that the semantic differential is a tool that requires refinement on an ongoing basis in order to elicit sensitive and precise interpretations. Thus, the extent to which a given set of adjectival scales is fit for purpose is always a matter for consideration. Methodology-oriented research may be undertaken to assess the appropriateness of the inclusion and exclusion of particular bi-polar scales. As Osgood, et al., (1957, p.186) state: *'For an ideal semantic measuring instrument we would like to select a small set of scales having the following properties: (a) high loading on the factor they represent, (b) high correlation with the other scales representing the same factor, (c) low correlation with scales representing other factors...and, (d) a high degree of stability across the various concepts judged'*.

The semantic differential scales selected for use in this thesis are based on the approach suggested by Maguire (1973)⁹³. The inclusion of some and exclusion of other scales is acknowledged to have an element of subjectivity but regarded as a necessary part of the first exploratory factor analysis of XBRL and of financial reporting and democratisation in an XBRL context. Moreover, the sample of respondents necessarily included

⁹³See section 4.4.

individuals from all parts of the world in order to generate sufficient research data to answer the primary research question. As such, the semantic differential was deployed without particular expectation that interpretations might be conditioned by geography, location, age, experience or industry. However, as XBRL matures and the number of XBRL-knowledgeable individuals increases, there will be greater opportunities to investigate similarities and differences in interpretations across specified categorical groups.

As part of the ongoing refinement of semantic differential instruments, scales may be included to replace those that do not prove to be useful. For example, whereas this thesis includes '*relevant-irrelevant*' and '*reliable-unreliable*' scales to represent qualitative characteristics of financial statements in order to interpret 'financial reporting', the other qualitative characteristics set out in the IASC (1989) and ASB (1999) conceptual frameworks could also be included. For example, the 'financial reporting' instrument could be refined to exclude the least useful scales (as measured by their communality coefficients in this thesis) and to include the qualitative characteristics of comparability and understandability instead.

Furthermore, useful scales may be identified by reference to research issues that are expressed in different ways in accounting literature. For example, Gray (1988) investigates cultural aspects of accounting and considers that accounting systems in different jurisdictions are conditioned by cultural values. He refers to Hofstede's (1984) dimensions of culture, namely (i) individualism versus collectivism, (ii) large versus small power distance, (iii) strong versus weak uncertainty avoidance, and (iv)

masculinity versus femininity. These dimensions of culture suggest that accounting and financial reporting may be usefully interpreted by reference to these terms.

The outcomes of this thesis can be added to using complementary research methods. For example, Orlikowski and Baroudi (1991) refer to field and ethnographic studies as types of methods which could add richness to understandings of concepts and could therefore be useful in the context of understanding XBRL (specifically) and financial reporting/IS (generally). Another complementary research method is to interview survey participants to investigate alternative interpretations and insights by XBRL experts. Additional insights could be provided in relation to the same concepts that are included in this thesis or other concepts that fall within XBRL and financial reporting vocabularies. A comparison of connotative interpretations of XBRL taxonomies is an example of alternative concepts that could be productively researched.

Chapter Three refers to SSK and Habermasian critical theory as potential alternative frameworks within which to investigate the relationship between XBRL and financial reporting. Both are based on ontological and epistemic principles that are similar to Searle's (1995) institutional reality. The conclusions in this thesis may provide motivation to critical theorists in terms of the potential domination that may be perpetuated by financial reporting systems that incorporate XBRL. Critical theorists may perceive assertions of democratisation as more likely to result in the status quo of Mouck's (1994) 'weak' democracy rather than any meaningful strengthening of accountability.

6.7 Final conclusion

Smith (2003, p.39) refers to three desirable qualitative characteristics of accounting research: '*good theory, reliability and validity*'. Smith (2003, p.39) also acknowledges that there are likely to be trade-offs between the qualitative characteristics when undertaking research. The research limitations of this thesis include discussion of reliability and validity. This thesis is completed with a consideration of its contribution to the development of financial reporting theory and practice.

The all-embracing theoretical notion underpinning the thesis is that computer and telecommunications technologies enhance the quality of financial reporting. The IASC (1989) and ASB (1999) conceptual framework documents state that the objectives of financial statements are to provide information that is useful to a wide range of users and to assess the stewardship of an entity's management. This thesis investigates the belief that these objectives are more likely to be achieved when XBRL is incorporated into the existing technology that is financial reporting. As such, facilitating accountability and the provision of decision-useful information provides the theoretical basis to the investigation.

The proliferation of technologies in modern financial reporting suggests that the truth of the whether the objectives of financial statements are more likely to be achieved when financial reporting incorporates particular computer and telecommunications technologies is a matter worth researching. However, this thesis posits that the relationship between computing/telecommunications technologies and financial reporting cannot be assumed to be explained merely by the rhetoric of technological determinism or notions of democratisation or revolutionary change.

The emergence of XBRL as a potentially disruptive technology, in terms of its capacity to 'democratise' financial reporting, is therefore regarded as a testable hypothesis. If the hypothesis is accepted as true, the implication is that the technology of financial reporting is affected⁹⁴ by the emergence of XBRL in a significant way. If the hypothesis is rejected, the implication is that there is insufficient evidence to support current claims that XBRL has any meaningful effect on financial reporting.

The testable hypothesis is set in a research framework that facilitates ontological and epistemic subjectivity on the basis that financial reporting exists within a contingent social reality. The consequence of operating within a social reality is that interpretations of the concepts included in the hypothesis cannot be assumed epistemically objective. As such, interpretations depend on individual attitudes and beliefs that may or may not be shared. Interpretive frameworks for each of the abstract concepts are operationalised as semantic differential constructs in order to elicit indirect interpretations of the concepts. Sets of valid and reliable responses to the constructs provide comparable interpretations of the concepts and thereby provide a basis for accepting or rejecting the hypothesis that XBRL democratises financial reporting.

The conclusion of this thesis is that there is insufficient evidence to accept the hypothesis that XBRL democratises financial reporting. Notwithstanding stable interpretive frameworks for each of the concepts for 'all' respondents, the patterns of factor scores differ across respondent groups and the interpretive frameworks become unstable when generated for individual respondent groups. At this point in the

⁹⁴The details of how financial reporting is affected to the extent that it is democratised depends on the perceptions of democratisation. Section 1.3 introduces the notion of the contingent meanings of democracy.

development of XBRL, its relationship with financial reporting remains an epistemically subjective matter. Consequently, it is premature to assert as generally true that the quality of financial reporting is enhanced by the emergence of XBRL.

It is possible that the democratisation of financial reporting as a result of XBRL may become an epistemically objective institutional fact in the future. However, as is the case for all potential institutional facts, it may never attain that status. As XBRL technologies mature and stakeholders become more knowledgeable about its practical possibilities and limitations, the relationship between XBRL and financial reporting may be expressed in different terms. Numerous potential institutional facts about XBRL may compete with each other in society for collective recognition and assignment of the status of being true.

While there is no generally accepted theory of external reporting, nor a universally agreed perspective of how accounting theories should be developed (Deegan & Unerman 2006, p.5; Mouck, 2004; Chua, 1986), a theory should contribute something to explain current practice and provide a basis for the future development of theory and/or practice (Sutton, 2004). This thesis provides a basis for robust development of theory by providing a mechanism whereby truth claims regarding new financial reporting technologies may be investigated. It explicitly includes the potential for ontological and epistemic subjectivity within its framework and provides a mechanism whereby data findings can be meaningfully linked back to the theories that are invoked to justify hypotheses. As such, it contributes to a potential solution to the problematic aspects of AIS research identified by Sutton (1992) and Xiao, et al., (1996).

Furthermore, the commencement of research into the relationship between financial reporting and an emerging technology within an appropriate research framework provides the basis for ongoing development of robust theory. As Xiao, et al., (2002) affirm: *'theory-guided research [is] particularly valuable as theory provides a framework for integrating empirical findings, enhances generalisability, and helps the researcher to see the forest as well as the trees'*. The opportunities for researching the relationship between XBRL and financial reporting may, in time, result in sufficient complementary evidence to legitimately conclude that XBRL democratises financial reporting and that XBRL is an empirical example of a technology that enhances the quality of financial reporting – but not yet.

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Appendix 1: First email request to potential survey participants

Hello [*potential participant*],

I am contacting you in connection with an XBRL research project I am undertaking at the University of Birmingham in the UK. I'd be very thankful if you could take five minutes to complete a short survey. The survey is (i) anonymous, (ii) non-technical and (iii) specifically set up to minimise the time required by you to complete it. The link to the survey is [*survey web address*].

Once you have read the instructions, you should work briskly through the survey. It would also be very helpful if you could send me a short confirmation email at some point after completion so that I can remove you from my follow up list. Your input will be extremely valuable to me.

For your information, I am undertaking this project with Professor David Alexander and Mr Andy Lymer at the University of Birmingham Business School. I am member of XBRL UK, a member of the IASCF XQRT, and have participated at numerous XBRL International Conferences.

For this particular project, I am gathering interpretations of XBRL, financial reporting and democratisation from individuals who have knowledge of XBRL for the purpose of investigating the extent to which there is a consensus that XBRL democratises financial reporting. Upon completion of my analysis, I intend to compile a summary of significant findings for distribution to survey participants.

As the survey is completed online, please note the website privacy policy, which is available at [*web address of privacy policy*].

Appendix 1 [contd]: First email request to potential survey participants

Many thanks for your assistance. Should you have any questions, please do not hesitate to contact me.

All the best,

Barry

Appendix 2: Second email request to potential survey participants

Hello [*potential participant*],

This is a gentle reminder about our XBRL research project. We'd like to include your input.

This work depends on individuals who have experience of XBRL which, as you might guess, somewhat restricts the number of potential participants. For this reason, I'd be very thankful if you could complete the survey so that the data are as representative as possible.

For your convenience, the link to the survey is [*survey web address*].

So far, the average time taken to complete the survey is less than five minutes. If you send me a short email of confirmation after completion, I will remove you from the follow up list.

Many thanks for your participation.

Barry

Appendix 3: Final email request to potential survey participants

Hi [*potential participant*],

I'm just about at the end of the data collection stage of this research project. If you have completed the survey – thank you very much. Your input is very much appreciated.

If not, you are still welcome to participate. The link is [*survey web address*].

All the best,

Barry

Appendix 4: List of Yahoo! Groups with XBRL as the subject matter of interest

	Yahoo! Group Name	No. of members	Group language	Yahoo! group category
1	xbrl-public	1327	English	Accountants
2	xbrl-dev	456	English	Specific programs
3	XBRL-COREP	352	English	Industry associations
4	XBRL_SIG_PAK	324	English	XML
5	tecsifeausp	235	Portuguese	Internet
6	XBRL-JP	226	Japanese	Accountants
7	xbrl-ifs	201	English	Other
8	XBRL-NL-Public	157	English	Finance professionals
9	XBRL-CRAS	135	English	Finance professionals
10	XBRL-GL-Public	126	English	Finance professionals
11	HCCABusinessIntelligenceStudyGroup	109	English	Accountants
12	XBRL-FINREP	102	English	Finance professionals
13	XBRL-IE	97	English	Finance professionals
14	XBRL-India	94	English	Programming languages
15	xbrl-sp	90	Spanish	Internet
16	XBRL-ES-TECNOLOGIA	87	Spanish	General
17	XBRL_Academic_Challenge	84	English	Specific programs
18	XBRL_CO_PUBLIC	79	Spanish	Other
19	XBRL-NL	73	Dutch	Finance professionals
20	xbrl-france	68	French	Finance professionals
21	XBRL-S3C	67	English	XML
22	XBRL-NZ-Public	65	English	Other
23	xbrl-pl	62	Polish	Accountants
24	XBRL-Italy	62	English	Industry associations
25	nyssa-xbrl	61	English	Finance professionals
26	XBRL-MarComm	61	English	Finance professionals
27	XBRL-ES-TAX	58	Spanish	Industry associations
28	XBRL-NZ	55	English	XML
29	XBRL-CN	51	English	Finance professionals
30	xbrlcolombia	45	Spanish	Other
31	RivetEducation	44	English	Education
32	xbrl-pl-dom	43	English	Finance professionals
33	PGC2007	42	Spanish	Other
34	XBRL-ES-DESARROLLO	41	Spanish	General
35	xbrl_colombia	40	Spanish	Internet
36	xbrl-pl-jur	38	Polish	Finance professionals
37	XBRL-ES-TAX-DGI	38	Spanish	Spain
38	XBRL-ES-BASILEAII	36	Spanish	General
39	projectox	31	Portuguese	Accountants
40	batavia-xbrl	31	English	Accountants
41	xbrl-au-dom	31	English	Specific programs
42	XBRL-IBEROAMERICA	29	Spanish	Finance professionals
43	xbrl-portugal	25	English	Blank
44	XBRL-ES-TAX-CONTALOC	23	Spanish	Finance professionals
45	XBRL-Versioning	23	English	Specific programs
46	xbrl-forschung	22	English	Information Technology
47	XBRL-CA-DOM	21	English	Data formats
48	XBRL-ES-TAX-CNMV-IPPSC	19	Spanish	Accountants
49	XBRL-NL-technik	19	English	Finance professionals
50	CEBS_XBRL_Network	18	English	Finance professionals
51	XBRL-ES-LENLOC	18	Spanish	Other

Appendix 4 [contd]: List of Yahoo! Groups with XBRL as the subject matter of interest

52	XBRL-CA-MarComm	18	English	Marketing and advertising
53	XBRL-IBEROAMERICA-SECTORPUBLICO	17	Spanish	Finance professionals
54	xbrl-be-pub	17	English	Finance professionals
55	XBRL-US-Coaches	17	English	Industry associations
56	XBRL-ES-MARKETING	17	Spanish	General
57	XBRL-IBEROAMERICA-DESARROLLO	16	Spanish	Finance professionals
58	XBRL-FORO	16	Spanish	Other
59	XBRL_UK_Technical	16	English	Finance professionals
60	XBRL_epbd	16	English	Energy
61	XBRL-Trustees	16	English	Other
62	xbrlsg	15	English	Industry associations
63	XBRL-IBEROAMERICA-SUPERVISIONBANCARIA	14	Spanish	Finance professionals
64	xbrl-solutions-nl	14	English	Business applications
65	XBRL_NL_INFRA_TBV_BE	14	Dutch	Finance professionals
66	xbrl-france-technologie	14	English	Communications and networking
67	xbrl-es-tecno-especificacion	13	Spanish	General
68	XBRL-NL-Assurance	13	English	Finance professionals
69	xbrl_fr	11	French	Globalisation
70	xbrl-uae	10	English	Accountants
71	xbrl_ch	10	English	Industry associations
72	xbrl-pl-marcom	9	English	Finance professionals
73	capacitacion_xbrlcol	8	Spanish	Other
74	XBRL_dk_td	8	English	Blank
75	savanetxbrl	8	English	Finance professionals
76	XBRL-NL-Bestuur	7	English	Finance professionals
77	taxonomias_xbrlcol	7	Spanish	Other
78	XBRL-TW	7	English	Accountants
79	proyecto_xbrl_peru	6	Spanish	Business applications
80	XBRL-IR	5	English	Finance professionals
81	xbrl_argentina	5	Spanish	Auditing and accounting
82	XBRL-UA	5	English	Accountants
83	XBRL_Research_Opportunities_Forum	4	English	Business schools
84	XBRL-GEO	4	English	Finance professionals
85	xbrl-it	4	Italian	Programming languages
86	team-xbrl-bf	4	Italian	Other
87	xbrl-ro	4	English	Blank
88	XBRL_MIA2003	3	English	Theory and methods
89	mercadeo_xbrlcol	3	Spanish	Other
90	XBRL_EuroNews	2	English	Industry associations
91	XBRLCHINA	2	English	Industry associations
92	XBRL-GEORGIA	2	English	Finance professionals
93	XBRL-NL-Belasting	2	English	Finance professionals
94	IntroXBRL-Book	2	English	Other
95	xbrl-th	2	English	Countries
96	pf_snijders	2	English	Business applications
97	ActiveBusinessReporting	2	English	Accountants
98	xbrl-deutschland	2	German	Accountants
99	xbrlng	1	English	Accountants
100	grupoIsistemasinformacion	1	Spanish	Business schools
101	gruposistemas1	1	Spanish	Business schools
102	xbrl-gr	1	English	Accountants
103	xbrlco	1	English	Industry associations
104	bus120bxbrl	1	English	Business applications

Appendix 5: Pilot survey instrument

Introduction and instructions

You are requested to express **your interpretation** of the three concepts that follow by reference to a series of scales.

Based on **your personal knowledge and experience**, you should choose the single position on each scale that reflects your interpretation of the concept.

For example, if you consider the concept at the top of the screen to be **extremely** good or bad (one of the scales being '*good-bad*'), you should choose one of the extreme positions on the scale:

good						bad
3	2	1	0	1	2	3
X						X

If you consider a concept is **quite closely** related to one or other end of a scale, you should **choose one of the two following positions**:

good						bad
3	2	1	0	1	2	3
	X				X	

If you consider the concept is **only slightly related** to one or other end of a scale, you should **choose one of the two following positions**:

good						bad
3	2	1	0	1	2	3
		X		X		

If you regard a particular scale to be irrelevant to the concept, then **choose the mid-point of the scale** as follows:

good						bad
3	2	1	0	1	2	3
			X			

You are requested to:

- (i) work briskly. It is your immediate responses that are most valuable.
- (ii) take care to make a separate and independent judgement for each scale. Some scales may appear similar to others but no two scales are exactly the same.

Appendix 5 [contd] - Pilot survey instrument

**Concept 1 of 3
FINANCIAL REPORTING**

uninformative 3	2	1	0	1	2	informative 3
powerful 3	2	1	0	1	2	weak 3
worthless 3	2	1	0	1	2	valuable 3
difficult 3	2	1	0	1	2	easy 3
uncertain 3	2	1	0	1	2	certain 3
weak 3	2	1	0	1	2	strong 3
convergent 3	2	1	0	1	2	divergent 3
dynamic 3	2	1	0	1	2	static 3
honest 3	2	1	0	1	2	dishonest 3
flexible 3	2	1	0	1	2	inflexible 3
disreputable 3	2	1	0	1	2	reputable 3
sick 3	2	1	0	1	2	healthy 3
untimely 3	2	1	0	1	2	timely 3
not influential 3	2	1	0	1	2	influential 3
good 3	2	1	0	1	2	bad 3
reliable 3	2	1	0	1	2	unreliable 3
subjective 3	2	1	0	1	2	objective 3
accountable 3	2	1	0	1	2	unaccountable 3
relevant 3	2	1	0	1	2	irrelevant 3
adequate 3	2	1	0	1	2	inadequate 3
active 3	2	1	0	1	2	passive 3
simple 3	2	1	0	1	2	complex 3
undemocratic 3	2	1	0	1	2	democratic 3
transparent 3	2	1	0	1	2	opaque 3
adverse 3	2	1	0	1	2	beneficial 3

Appendix 5 [contd]: Pilot survey instrument

Concept 2 of 3

XBRL

usable 3	2	1	0	1	2	cumbersome 3
rigid 3	2	1	0	1	2	flexible 3
powerful 3	2	1	0	1	2	impotent 3
sceptical 3	2	1	0	1	2	believing 3
progressive 3	2	1	0	1	2	regressive 3
effective 3	2	1	0	1	2	ineffective 3
available 3	2	1	0	1	2	unavailable 3
obscure 3	2	1	0	1	2	clear 3
bad 3	2	1	0	1	2	good 3
not democratising 3	2	1	0	1	2	democratising 3
warranted 3	2	1	0	1	2	unwarranted 3
successful 3	2	1	0	1	2	unsuccessful 3
constraining 3	2	1	0	1	2	liberating 3
weak 3	2	1	0	1	2	strong 3
evolutionary 3	2	1	0	1	2	revolutionary 3
pessimistic 3	2	1	0	1	2	optimistic 3
simple 3	2	1	0	1	2	complex 3
opaque 3	2	1	0	1	2	transparent 3
inefficient 3	2	1	0	1	2	efficient 3
passive 3	2	1	0	1	2	active 3
helpful 3	2	1	0	1	2	unhelpful 3
difficult 3	2	1	0	1	2	easy 3
meaningful 3	2	1	0	1	2	meaningless 3
productivity increasing 3	2	1	0	1	2	productivity decreasing 3
superior 3	2	1	0	1	2	inferior 3

Appendix 5 [contd]: Pilot survey instrument

**Concept 3 of 3
DEMOCRATISATION**

imaginary 3	2	1	0	1	2	real 3
uncertain 3	2	1	0	1	2	certain 3
reduced accountability 3	2	1	0	1	2	enhanced accountability 3
timely 3	2	1	0	1	2	untimely 3
true 3	2	1	0	1	2	false 3
still 3	2	1	0	1	2	vibrant 3
meaningless 3	2	1	0	1	2	meaningful 3
incomplete 3	2	1	0	1	2	complete 3
stable 3	2	1	0	1	2	unstable 3
formless 3	2	1	0	1	2	formed 3
visible 3	2	1	0	1	2	invisible 3
unsafe 3	2	1	0	1	2	safe 3
positive 3	2	1	0	1	2	negative 3
bad 3	2	1	0	1	2	good 3
near 3	2	1	0	1	2	far 3
society 3	2	1	0	1	2	individual 3
liberating 3	2	1	0	1	2	constraining 3
successful 3	2	1	0	1	2	unsuccessful 3
feeble 3	2	1	0	1	2	vigorous 3
strong 3	2	1	0	1	2	weak 3
private 3	2	1	0	1	2	public 3
dynamic 3	2	1	0	1	2	static 3
improbable 3	2	1	0	1	2	probable 3
complete 3	2	1	0	1	2	incomplete 3
active 3	2	1	0	1	2	passive 3

Appendix 5 [contd]: Pilot survey instrument

Based on **your personal knowledge and experience of XBRL**, please indicate the extent of your agreement or disagreement with the following statement:

XBRL democratises financial reporting

disagree strongly	disagree	neither agree nor disagree	agree	agree strongly

Where are you from?

USA	Canada	Rest of Americas	UK/Ireland	Rest of Europe	Asia	Australasia	Africa

In which capacity do you work with XBRL?

Regulator or government agency	Software tools developer	Business consultant or service integrator	Instance preparer for internal/external consumption	Taxonomy developer	Analyst or investor relations	Not for profit

For how long have you worked with XBRL?

Less than one year	More than one and less than two years	More than two and less than four years	More than four and less than six years	More than six and less than eight years	More than eight years

Your gender:

Male	Female

Your age group:

Under 25	26 - 35	36 - 45	46 - 55	56 - 65	Over 65

Appendix 6: Finalised survey instrument

Introduction and instructions

You are requested to express **your interpretation** of the three concepts that follow by reference to a series of scales.

Based on **your personal knowledge and experience**, you should choose the single position on each scale that reflects your interpretation of the concept.

For example, if you consider the concept at the top of the screen to be **extremely** good or bad (one of the scales being ‘*good-bad*’), you should choose one of the extreme positions on the scale:

good						bad
3	2	1	0	1	2	3
X						X

If you consider a concept is **quite closely** related to one or other end of a scale, you should **choose one of the two following positions**:

good						bad
3	2	1	0	1	2	3
	X				X	

If you consider the concept is **only slightly related** to one or other end of a scale, you should **choose one of the two following positions**:

good						bad
3	2	1	0	1	2	3
		X		X		

If you regard a particular scale to be irrelevant to the concept, then **choose the mid-point of the scale** as follows:

good						bad
3	2	1	0	1	2	3
			X			

Appendix 6[contd]: Finalised survey instrument

Concept 1 of 3

FINANCIAL REPORTING

easy 3	2	1	0	1	2	difficult 3
inadequate 3	2	1	0	1	2	adequate 3
informative 3	2	1	0	1	2	uninformative 3
reliable 3	2	1	0	1	2	unreliable 3
healthy 3	2	1	0	1	2	unhealthy 3
honest 3	2	1	0	1	2	dishonest 3
valuable 3	2	1	0	1	2	worthless 3
flexible 3	2	1	0	1	2	inflexible 3
impotent 3	2	1	0	1	2	powerful 3
disreputable 3	2	1	0	1	2	reputable 3
pointless 3	2	1	0	1	2	beneficial 3
influential 3	2	1	0	1	2	not influential 3
dynamic 3	2	1	0	1	2	static 3
undemocratic 3	2	1	0	1	2	democratic 3
complex 3	2	1	0	1	2	simple 3
strong 3	2	1	0	1	2	weak 3
bad 3	2	1	0	1	2	good 3

Refer to note 3 of section 5.2.1. There are 17 scales for the ‘financial reporting’ concept. The ‘*strong-weak*’ and ‘*good-bad*’ scales are included in the final survey instruments as synonym scales for ‘*powerful-impotent*’ and ‘*pointless-beneficial*’ respectively. They are included only to test respondent reliability. They are not included in the factor analysis of the ‘financial reporting’ concept.

Appendix 6[contd]: Finalised survey instrument

Concept 2 of 3

XBRL

helpful 3	2	1	0	1	2	unhelpful 3
unavailable 3	2	1	0	1	2	available 3
constraining 3	2	1	0	1	2	liberating 3
inefficient 3	2	1	0	1	2	efficient 3
strong 3	2	1	0	1	2	weak 3
successful 3	2	1	0	1	2	unsuccessful 3
complex 3	2	1	0	1	2	simple 3
obscure 3	2	1	0	1	2	clear 3
powerful 3	2	1	0	1	2	impotent 3
productivity increasing 3	2	1	0	1	2	productivity decreasing 3
meaningful 3	2	1	0	1	2	meaningless 3
believing 3	2	1	0	1	2	sceptical 3
democratising 3	2	1	0	1	2	not democratising 3
cumbersome 3	2	1	0	1	2	usable 3
easy 3	2	1	0	1	2	difficult 3

Appendix 6[contd]: Finalised survey instrument

Concept 3 of 3

DEMOCRATISATION

complete 3	2	1	0	1	2	incomplete 3
passive 3	2	1	0	1	2	active 3
good 3	2	1	0	1	2	bad 3
unsuccessful 3	2	1	0	1	2	successful 3
formless 3	2	1	0	1	2	formed 3
individual 3	2	1	0	1	2	society 3
meaningless 3	2	1	0	1	2	meaningful 3
visible 3	2	1	0	1	2	invisible 3
real 3	2	1	0	1	2	imaginary 3
negative 3	2	1	0	1	2	positive 3
weak 3	2	1	0	1	2	strong 3
uncertain 3	2	1	0	1	2	certain 3
timely 3	2	1	0	1	2	untimely 3
vibrant 3	2	1	0	1	2	feeble 3
partial 3	2	1	0	1	2	whole 3

Appendix 6[contd]: Finalised survey instrument

Based on **your personal knowledge and experience of XBRL**, please indicate the extent of your agreement or disagreement with the following statement:

XBRL democratises financial reporting

disagree strongly	disagree	neither agree nor disagree	agree	agree strongly

Where are you from?

USA	Canada	Rest of Americas	UK/Ireland	Rest of Europe	Asia	Australasia	Africa

In which capacity do you work with XBRL?

Regulator or government agency	Software tools developer	Business consultant or service integrator	Instance preparer for internal/external consumption	Taxonomy developer	Analyst or investor relations	Not for profit

For how long have you worked with XBRL?

Less than one year	More than one and less than two years	More than two and less than four years	More than four and less than six years	More than six and less than eight years	More than eight years

Your gender:

Male	Female

Your age group:

Under 25	26 - 35	36 - 45	46 - 55	56 - 65	Over 65

Appendix 7: Five-factor analysis of ‘financial reporting’ concept for all (249) survey respondents

Correlations between scales and factors	F1	F2	F3	F4	F5	h2
honest – dishonest	0.818	0.169	0.071	0.021	-0.061	0.707
reputable – disreputable	0.686	0.147	0.286	0.034	-0.002	0.575
healthy – unhealthy	0.686	0.339	-0.045	0.191	0.072	0.629
adequate – inadequate	0.555	0.064	0.533	0.097	0.093	0.614
reliable – unreliable	0.502	0.039	0.640	0.066	0.064	0.671
valuable – worthless	0.207	0.739	0.117	0.078	-0.040	0.611
influential- not influential	0.006	0.703	0.105	0.083	-0.108	0.523
beneficial – pointless	0.392	0.682	-0.009	-0.008	0.043	0.621
powerful – impotent	0.142	0.552	0.366	0.142	-0.152	0.502
informative – uninformative	0.012	0.288	0.853	0.071	0.039	0.817
flexible – inflexible	0.017	0.093	-0.062	0.865	0.012	0.761
dynamic – static	0.140	0.103	0.228	0.806	0.043	0.733
easy – difficult	-0.042	0.021	0.046	0.074	0.856	0.743
simple – complex	0.079	-0.163	0.023	-0.003	0.842	0.743
democratic – undemocratic	0.274	0.349	0.109	0.290	0.175	0.323
Percentage of variance:	F1	F2	F3	F4	F5	
Variability (%)	16.595	14.878	11.596	10.513	10.246	
Cumulative %	16.595	31.473	43.069	53.583	63.829	

Refer to section 5.3.2. The five-factor interpretive framework for ‘financial reporting’ increases the cumulative variability in scale ratings captured by the interpretive framework to 63.829%. Based on the results of split-half reliability testing, however, the five-factor structure is concluded to be insufficiently stable. In comparison to the three-factor structure, the five-factor structure distinguishes the integrity of financial reporting (F1) from what could be labelled its ‘utility’ (F2).

Appendix 8: Three-factor scores for all survey respondents for the ‘XBRL’ concept

Respondent	F1	F2	F3	Respondent	F1	F2	F3
1	-0.189	-0.833	-0.399	41	0.314	-1.161	1.208
2	-0.525	-0.884	0.866	42	-0.093	-1.645	0.304
3	-0.901	-1.560	0.088	43	1.109	-1.210	-2.037
4	0.798	-0.031	-0.130	44	2.401	-0.822	-2.703
5	1.659	-2.651	-0.508	45	-0.787	0.631	-1.555
6	0.271	-1.703	-0.249	46	-2.212	-1.267	-0.758
7	0.637	0.260	1.044	47	-0.145	-0.967	1.447
8	-0.047	-0.630	-0.264	48	-0.969	0.776	1.171
9	0.964	0.310	-0.706	49	0.202	0.443	-0.002
10	0.000	-0.235	-1.000	50	-0.349	-0.996	-1.840
11	-0.625	0.513	-0.780	51	1.227	-0.580	0.084
12	0.150	-0.330	1.262	52	0.532	-0.290	1.474
13	-0.986	0.561	-0.368	53	-1.569	-1.618	0.624
14	0.466	0.834	-0.988	54	0.564	1.558	0.330
15	1.817	-0.183	0.031	55	0.789	0.232	0.273
16	0.413	-1.082	-2.379	56	0.069	0.595	0.325
17	0.221	0.116	-0.472	57	1.149	0.500	0.054
18	-0.810	-0.971	-0.924	58	1.221	-0.661	-1.077
19	0.528	-0.921	2.126	59	0.333	-0.600	0.761
20	-1.128	1.642	1.835	60	0.093	-0.992	0.326
21	0.574	0.199	-0.015	61	-0.580	0.032	1.524
22	1.206	-0.444	0.284	62	-1.441	-0.671	0.864
23	0.053	1.474	-2.287	63	-0.910	1.256	-0.271
24	0.563	-1.443	-0.520	64	-1.017	-1.000	-1.815
25	0.885	0.275	0.949	65	-0.080	-0.633	-0.977
26	-1.798	1.812	0.153	66	0.407	0.526	0.152
27	-1.267	-0.510	-0.085	67	-0.495	0.057	-0.789
28	1.298	-0.722	1.701	68	-0.698	-1.088	1.264
29	0.275	-0.220	-1.522	69	-0.648	-0.285	-0.554
30	-0.222	0.870	0.950	70	0.389	-0.332	-0.230
31	-0.132	0.382	-0.104	71	0.847	-0.062	0.692
32	0.007	-0.575	-1.690	72	-0.522	-0.703	0.527
33	0.873	1.670	-0.693	73	0.631	-0.071	-0.637
34	1.072	1.309	-0.171	74	-0.166	-0.179	0.684
35	0.938	-1.166	0.913	75	-2.871	-0.994	-0.643
36	-0.643	0.235	0.916	76	0.721	-1.521	-0.247
37	0.819	-0.007	0.678	77	-1.736	0.332	-0.661
38	1.040	-0.685	-0.607	78	-0.436	-1.533	0.517
39	1.052	-0.406	-0.562	79	1.669	-1.228	-1.019
40	1.340	2.758	-0.597	80	1.023	-0.226	-1.497

Appendix 8 [contd] - Three-factor scores for all survey respondents for the 'XBRL' concept

Respondent	F1	F2	F3
81	1.300	-0.615	0.198
82	0.658	-0.091	1.072
83	-0.155	2.167	1.466
84	-0.570	-1.222	-0.405
85	0.788	-0.310	0.041
86	1.600	-1.806	0.656
87	0.598	1.138	1.401
88	-0.618	0.492	-0.301
89	-0.173	-0.202	0.771
90	-0.778	0.342	-0.545
91	-0.973	-0.276	-0.193
92	0.107	0.495	-0.578
93	0.384	-0.474	0.634
94	0.700	-1.538	0.878
95	1.046	-1.470	-1.159
96	0.237	1.047	-0.163
97	0.538	0.703	0.566
98	-1.529	-1.262	2.317
99	1.143	-1.107	0.118
100	0.465	-0.291	0.701
101	-0.099	-0.070	-1.043
102	0.133	0.913	0.303
103	-1.918	-0.434	-1.882
104	-1.273	1.050	0.890
105	1.044	0.931	1.164
106	0.731	0.605	0.966
107	0.906	1.815	1.051
108	-0.405	0.088	0.128
109	-0.927	-0.001	0.258
110	-0.841	-0.823	0.049
111	1.463	0.464	-1.518
112	-0.371	1.277	-0.013
113	0.706	0.257	-2.786
114	0.414	-0.674	0.371
115	1.059	1.185	1.184
116	-0.413	-0.275	-0.489
117	1.807	-0.477	-0.976
118	-0.492	-1.037	1.092
119	0.572	0.045	-0.994
120	0.290	0.910	-0.702

Respondent	F1	F2	F3
121	-1.012	0.942	0.571
122	-0.086	-1.323	-0.282
123	-0.682	-0.443	-0.034
124	0.836	-0.348	0.181
125	-1.133	0.554	-0.669
126	0.250	1.839	0.629
127	-1.752	0.233	0.186
128	-0.427	0.345	-0.732
129	-0.629	-1.398	-0.715
130	0.345	1.083	0.873
131	-0.935	-1.505	0.290
132	0.136	-0.693	-1.169
133	-1.553	-0.849	-1.370
134	-0.498	1.567	-0.487
135	0.192	0.129	0.383
136	1.691	0.872	-1.564
137	1.050	-1.195	0.549
138	0.125	-0.145	0.935
139	0.462	0.110	-0.372
140	-1.137	-0.898	0.671
141	-0.676	-0.164	0.451
142	-1.271	0.260	0.508
143	-0.238	-0.281	-0.031
144	-0.307	0.055	1.394
145	-0.612	0.026	-0.274
146	0.175	-0.453	0.138
147	-0.346	-0.302	0.395
148	0.218	-0.133	0.474
149	-0.313	-1.284	0.154
150	-0.655	0.507	1.553
151	1.133	1.530	-1.676
152	0.040	0.474	1.327
153	-0.034	-1.339	1.156
154	0.754	-0.033	-0.190
155	-0.590	0.393	-1.389
156	-0.211	0.788	-1.183
157	0.423	0.986	-0.949
158	-3.218	-0.049	-0.387
159	-0.251	0.941	-1.141
160	-1.946	0.466	-1.105

Appendix 8[contd] - Three-factor scores for all survey respondents for the ‘XBRL’ concept

Respondent	F1	F2	F3
161	-0.379	-0.362	1.404
162	0.613	0.362	-0.915
163	0.259	-0.479	-1.369
164	-0.802	0.048	0.076
165	0.660	1.846	0.162
166	-0.208	-1.486	-0.083
167	-0.091	2.091	0.716
168	-1.109	1.428	-0.192
169	-0.202	0.041	-0.604
170	0.457	-1.060	-0.923
171	0.073	1.560	-1.099
172	-0.703	0.914	1.463
173	0.327	-0.244	0.519
174	-0.465	0.007	-0.220
175	0.469	-1.527	0.604
176	-0.005	1.763	0.400
177	0.926	1.895	0.764
178	0.928	0.956	0.158
179	-1.707	1.673	0.258
180	1.322	-1.120	-1.557
181	-1.926	0.810	-1.531
182	-0.067	1.077	0.039
183	0.679	0.913	1.261
184	0.964	-0.624	1.279
185	0.797	-1.026	0.787
186	0.008	0.081	-0.659
187	1.139	1.507	0.081
188	-1.929	0.209	-0.168
189	-0.583	0.452	0.230
190	0.300	-1.030	-0.405
191	-0.460	0.293	-0.742
192	2.221	-0.626	-1.721
193	-0.051	1.964	-0.161
194	-0.068	-1.103	-0.026
195	1.220	-1.848	0.376
196	0.197	0.745	-1.480
197	-1.846	-1.029	-0.323
198	1.304	-0.342	0.917
199	0.890	-0.809	1.404
200	0.549	-1.133	1.322

Respondent	F1	F2	F3
201	0.016	0.839	0.883
202	-1.891	0.867	-0.224
203	1.206	-0.117	-0.748
204	1.626	-1.217	0.793
205	-0.406	-0.182	2.360
206	0.531	-0.092	0.025
207	-0.519	1.115	0.098
208	-0.464	-0.634	1.579
209	0.139	0.250	-0.070
210	1.282	2.424	-1.185
211	0.622	0.713	0.144
212	0.275	-0.779	0.047
213	-0.546	-0.461	-0.255
214	-0.827	-0.362	1.422
215	0.310	-0.197	0.560
216	-0.974	-1.269	2.281
217	-0.247	-0.820	1.891
218	0.683	1.043	1.347
219	-1.552	0.797	0.514
220	0.671	0.354	0.349
221	0.677	0.729	0.894
222	-1.358	-1.130	-1.035
223	-1.643	2.588	-1.160
224	1.645	-1.285	-1.123
225	-0.848	-1.323	0.405
226	0.430	2.284	-0.093
227	0.872	1.850	1.058
228	-0.091	0.573	-1.191
229	0.231	-0.086	1.666
230	0.931	-1.346	-1.308
231	-1.308	1.518	-0.903
232	-0.363	-0.172	0.791
233	1.143	0.527	0.877
234	-3.153	-1.104	-1.203
235	-1.145	-0.706	1.942
236	-0.352	2.107	0.611
237	-4.253	-0.677	-1.152
238	1.074	0.221	-1.215
239	0.814	-0.122	0.697
240	-0.676	-0.162	-0.864

Appendix 8[contd] - Three-factor scores for all survey respondents for the 'XBRL' concept

Respondent	F1	F2	F3
241	0.523	0.313	0.351
242	0.358	1.932	-1.722
243	1.049	1.804	0.760
244	-1.949	-0.701	-0.534
245	-1.263	-0.097	-1.696
246	0.649	-0.594	-1.964
247	0.932	0.191	-0.019
248	0.571	0.240	1.130
249	-0.229	0.203	1.451

Appendix 9: Three factor analysis of ‘democratisation’ concept for all (234) survey respondents

Correlations between variables and factors	F1	F2	F3	h2
negative-positive	0.830	0.115	0.149	0.725
meaningless-meaningful	0.788	0.111	0.118	0.647
good-bad	0.763	0.058	0.045	0.588
vibrant-feeble	0.628	0.224	-0.011	0.445
real-imaginary	0.615	0.305	0.269	0.544
weak-strong	0.612	0.449	0.056	0.580
complete-incomplete	-0.042	0.802	0.093	0.654
unsuccessful-successful	0.284	0.726	0.277	0.685
partial-whole	0.222	0.725	0.098	0.584
uncertain-certain	0.431	0.543	0.167	0.508
formless-formed	0.003	0.202	0.724	0.566
individual-society	0.041	0.008	0.626	0.393
visible-invisible	0.415	0.171	0.465	0.417
passive-active	0.363	0.446	-0.072	0.336
timely-untimely	0.494	0.309	-0.266	0.411
Percentage of variance:	F1	F2	F3	
Variability (%)	26.051	18.205	9.633	
Cumulative variability (%)	26.051	44.255	53.888	
Split-half correlations:	F1	F2	F3	
Three-factor structure	0.9235	0.7603	0.3740	

Refer to section 5.3.3. The three-factor structure for ‘democratisation’ increases the cumulative variability in scale ratings captured by the interpretive framework to 53.888%. Based on the results of split-half reliability testing however, the three-factor structure is insufficiently stable. The scales that are significant for the two-factor structure are also significant for the three-factor structure with the exceptions of ‘*timely-untimely*’ (which is less significant in the three-factor structure) and ‘*individual-society*’ (which becomes significant in the three-factor structure as part of the third factor).

Appendix 10: Descriptive statistical analysis of ‘XBRL’ groups based on median factor scores

Group	Count of respondents	Response to substantive assertion (average)	Response to substantive assertion (standard deviation)	Response to substantive assertion (skewness)	First factor average score	Second factor average score	Third factor average score
1	31	2.87	0.91	-0.271	-1.028	-0.754	-0.759
2	35	3.60	0.87	-0.991	-0.784	0.723	-0.712
3	30	3.57	0.84	-0.389	-0.618	-0.883	0.964
4	28	3.50	0.82	0.000	-0.697	0.848	0.781
5	29	3.97	1.00	-1.217	0.997	-0.865	-1.017
6	29	4.10	0.84	-1.627	0.690	0.780	-0.779
7	34	4.21	0.90	-1.674	0.739	-0.734	0.765
8	33	4.06	1.20	-1.515	0.705	0.855	0.718
all	249	3.74	1.02	-0.797	0.000	0.000	0.000

Refer to section 5.4.1.1. Values greater than the columnar value for ‘all’ respondents are highlighted in red. Values less than the columnar value for ‘all’ respondents are highlighted in green. The first factor average scores are higher for groups five to eight – this corresponds to the average response to the substantive assertion. Furthermore, with the exception of group four, the skewness of the responses to the substantive assertion is negative for all groups. Negative skewness is expected given a clear majority of survey respondents who agree with the substantive assertion⁹⁶. However, the skewness values for groups five to eight are noticeably lower than for groups one to four. The higher substantive response averages and lower skewness averages suggest a concentration of respondents who agree with the substantive assertion in groups five to eight.

⁹⁶A negative skewness value confirms that the distribution tail is to the left side (due to fewer respondents choosing the ‘disagree’ and ‘disagree strongly’ options).

Appendix 11: Descriptive statistical analysis of ‘financial reporting’ groups based on median factor scores

Group	Count of respondents	Substantive response (average)	Substantive response (standard deviation)	Substantive response (skewness)	First factor average score	Second factor average score	Third factor average score
1	28	3.57	1.05	-0.580	-0.618	-0.763	-0.862
2	33	3.27	1.24	-0.250	-0.912	0.917	-0.737
3	33	3.85	1.02	-0.760	-0.914	-0.894	0.858
4	30	3.87	0.76	-0.230	-0.651	0.638	0.784
5	38	3.84	0.99	-1.360	0.781	-0.700	-1.003
6	25	3.68	0.97	-0.950	0.666	0.792	-0.664
7	25	4.00	0.98	-1.330	0.710	-0.731	0.899
8	37	3.84	0.92	-0.530	0.892	0.718	0.781
All	249	3.74	1.02	-0.797	0.000	0.000	0.000

Refer to section 5.4.1.2. Values greater than the columnar value for ‘all’ respondents are highlighted in red. Values less than the columnar value for ‘all’ respondents are highlighted in green. With the exceptions of groups one and two, the average scores for the responses to the substantive assertion are similar across the groups. The standard deviations are also very similar with the most notable exception being group two. The averages and standard deviations reveal that most groups are very similar in terms of the mean and distribution around the mean. These findings provide corroborative evidence that interpretations of ‘financial reporting’ are similar across the respondent groups.

The lower values for skewness (indicating a skew towards agreement with the substantive assertion), specifically for groups five to seven, are consistent with higher factor scores for the first factor. For group eight, the skewness is not as low but the standard deviation for this group is the lowest across groups five to eight. A review of the group eight respondents reveals that none ‘disagree strongly’ with the substantive assertion. Furthermore, fewer members of this group ‘agree strongly’ with the substantive assertion in comparison to groups five, six and seven. This absence of any

Appendix 11[contd]: Descriptive statistical analysis of ‘financial reporting’ groups based on median factor scores

‘disagree strongly’ respondents and the comparatively low number of ‘agree strongly’ respondents have the effect of lowering both the standard deviation and skewness for this group.

Groups one to four are characterised by comparatively high skewness values⁹⁷. This, combined with the fact that the lowest value for the substantive assertion average for these groups is 3.27, suggests that these groups predominantly comprise respondents who ‘agree’ or ‘neither agree nor disagree’ with the substantive assertion. The comparatively low first factor scores for these groups suggest there may be some association between lower factor scores and lower substantive assertion averages (particularly for groups one and two).

Overall, the descriptive statistics indicate a high degree of similarity across the groups in terms of averages and standard deviations but the possibility of significant association between responses to the substantive assertion and factor scores due to the skewness of the substantive response averages. However, the possibility of significant associations does not appear to be as strong for the ‘financial reporting’ concept as for the ‘XBRL’ concept based on the equivalent ‘XBRL’ descriptive statistics.

⁹⁷Although the skewness values are comparatively high, they are still negative which indicates that the majority of respondents in these groups agree or agree strongly with the substantive assertion. This is supported by the average values for the substantive assertion, the lowest of which for groups one to four is 3.27.

Appendix 12: Three-factor scores for all survey respondents for the ‘financial reporting’ concept

Respondent	F1	F2	F3	Respondent	F1	F2	F3
1	-1.854	0.968	1.022	41	-1.596	-0.165	-0.198
2	-1.183	-0.382	0.761	42	-1.667	-0.941	-0.800
3	0.384	0.417	-0.955	43	0.080	-0.852	1.465
4	-0.184	-1.546	1.354	44	-1.832	1.100	1.567
5	0.301	-0.433	-1.540	45	-1.273	1.277	-1.774
6	1.197	-1.189	-0.092	46	0.681	0.067	-0.768
7	-0.585	0.019	1.107	47	1.145	0.484	-0.467
8	-1.099	-0.549	-0.589	48	0.779	-0.064	0.320
9	0.102	-0.606	-1.878	49	-0.391	-0.416	0.442
10	-1.539	1.538	0.645	50	-0.046	-0.855	0.248
11	0.771	0.456	0.360	51	-1.108	-0.942	0.352
12	1.268	-0.661	0.477	52	1.743	-1.468	-1.587
13	-0.735	0.569	-0.080	53	0.995	-1.539	0.269
14	-0.258	-0.460	0.325	54	1.366	2.079	1.471
15	1.800	0.202	-0.307	55	0.430	-1.303	-1.499
16	0.780	-0.930	-1.141	56	-2.613	0.502	-1.217
17	0.426	-0.374	-0.210	57	1.008	-0.094	-0.301
18	1.261	0.657	0.515	58	0.269	-1.537	1.935
19	1.532	-1.353	-1.144	59	0.483	-1.298	-0.449
20	0.060	-0.570	-1.015	60	-2.109	-0.333	0.341
21	0.495	-0.331	-1.023	61	0.388	-0.506	-0.832
22	0.268	0.189	-0.022	62	0.120	0.490	0.411
23	0.081	-0.384	0.173	63	-0.473	0.684	1.243
24	-0.636	-0.378	1.560	64	-0.173	-1.337	-1.405
25	0.214	-0.400	1.308	65	-0.723	0.288	0.046
26	-0.430	-0.498	-0.987	66	1.260	-1.136	-0.638
27	-0.558	0.006	0.326	67	-0.616	-0.261	-0.238
28	1.745	-1.171	1.447	68	0.637	-0.704	-1.083
29	-0.544	-0.016	-0.085	69	0.026	0.169	0.133
30	-0.629	0.822	1.131	70	1.002	0.776	0.182
31	-0.064	0.014	0.782	71	-0.132	-0.548	-0.959
32	-1.757	-1.120	1.003	72	0.158	1.391	-0.244
33	-0.989	-0.058	0.692	73	0.319	2.924	-1.839
34	0.046	-0.314	-1.387	74	0.858	-0.131	0.822
35	-0.083	-1.086	1.521	75	-2.280	1.708	-0.309
36	0.141	0.646	-0.534	76	-0.580	-0.642	-0.868
37	-2.108	-1.204	0.780	77	0.035	2.371	0.960
38	-0.014	-1.079	0.673	78	-0.208	-0.430	-1.743
39	-0.752	-0.412	-0.470	79	-0.895	-1.905	-1.449
40	-2.700	-0.339	0.261	80	0.559	-0.710	-0.106

Appendix 12[contd] - Three-factor scores for all survey respondents for the ‘financial reporting’ concept

Respondent	F1	F2	F3	Respondent	F1	F2	F3
81	0.767	0.468	1.204	121	0.073	1.551	-0.109
82	0.431	1.418	0.062	122	0.903	-0.381	-0.479
83	-0.083	0.682	-1.701	123	0.965	0.111	0.654
84	-0.686	0.815	-0.259	124	0.465	-0.589	0.738
85	-0.327	0.351	0.735	125	-0.728	0.024	-0.826
86	1.450	-0.742	1.611	126	0.848	0.420	1.141
87	-2.304	-1.300	0.148	127	-0.754	0.740	-0.585
88	-0.135	-0.327	0.851	128	-0.053	2.041	-0.992
89	0.141	0.947	0.721	129	0.692	-1.067	1.334
90	0.973	-0.694	-0.335	130	1.064	-0.286	-0.192
91	-1.059	2.013	0.389	131	0.206	-0.264	0.929
92	0.969	-0.640	0.232	132	0.710	-0.365	-1.684
93	0.486	-0.738	-0.881	133	-1.250	0.736	-0.582
94	-0.805	-0.017	1.425	134	0.558	-0.728	0.517
95	0.686	-0.746	-1.522	135	-0.773	0.048	-0.977
96	-0.424	-0.941	0.620	136	-0.043	-0.451	-1.447
97	1.136	-0.504	-0.416	137	0.609	-1.225	1.702
98	-0.301	-0.528	0.617	138	-0.158	-0.686	1.257
99	0.042	-1.039	-0.029	139	1.501	-0.793	-2.685
100	0.372	-0.240	0.624	140	-0.962	0.431	0.578
101	0.082	-0.197	-1.284	141	-0.281	0.635	1.324
102	-0.920	-0.387	-0.675	142	0.369	0.237	0.470
103	-0.152	-0.883	-0.433	143	-0.191	-0.393	-0.778
104	-0.246	-1.141	-1.520	144	-0.236	-1.441	-0.259
105	2.032	-0.020	0.157	145	0.331	-0.023	-0.887
106	1.281	1.282	1.178	146	0.190	1.619	-1.226
107	-0.022	-0.560	-1.460	147	-0.381	1.193	0.299
108	0.569	0.035	0.585	148	1.071	0.134	-1.481
109	-0.427	-0.293	1.380	149	0.624	-0.651	-0.851
110	0.958	-0.919	1.223	150	0.638	-0.462	0.530
111	0.253	-0.282	0.632	151	-1.866	0.039	-2.195
112	-1.458	-0.407	1.294	152	0.993	0.560	1.519
113	-0.480	-1.233	1.299	153	-0.423	-1.536	-0.905
114	-0.442	-1.571	1.448	154	-0.041	0.030	0.969
115	0.848	-0.211	0.471	155	-0.492	2.471	1.052
116	0.848	1.327	-0.910	156	1.602	0.446	0.288
117	1.590	-0.657	1.725	157	0.324	0.032	-0.596
118	1.055	0.360	-1.066	158	-1.804	-0.260	-0.393
119	0.037	0.175	0.098	159	-1.155	-0.648	0.155
120	0.113	-0.506	0.018	160	1.282	-0.454	-1.560

Appendix 12[contd] - Three-factor scores for all survey respondents for the ‘financial reporting’ concept

Respondent	F1	F2	F3	Respondent	F1	F2	F3
161	0.496	0.886	0.882	201	-0.289	-0.929	-0.875
162	-0.492	-0.452	-1.971	202	0.316	-0.531	-1.356
163	0.491	0.646	0.270	203	0.190	-0.502	-1.059
164	-0.334	-0.468	-0.626	204	0.499	-0.597	0.162
165	-3.381	0.877	-2.789	205	1.618	0.046	1.343
166	-0.443	0.142	-0.585	206	-2.358	-0.968	0.743
167	0.691	0.164	-0.201	207	0.861	0.390	0.023
168	-2.458	1.047	1.183	208	-0.470	1.172	-0.030
169	-1.303	-0.320	-0.729	209	0.895	0.677	1.081
170	1.624	2.959	-1.910	210	-1.624	0.709	-1.165
171	0.155	1.019	1.529	211	0.790	1.635	1.013
172	-0.481	0.073	1.176	212	-0.401	-0.097	-0.296
173	-0.999	-0.578	-0.668	213	0.115	0.301	-0.459
174	1.131	-0.733	-0.578	214	1.611	0.638	1.004
175	1.181	2.447	-0.016	215	0.714	-0.212	0.874
176	1.751	0.634	0.167	216	0.806	-0.128	-0.254
177	0.150	0.702	1.397	217	0.287	0.018	0.938
178	-0.794	-0.761	1.754	218	0.452	-0.126	1.996
179	-0.039	2.455	-0.773	219	-0.177	-0.674	1.192
180	-1.162	0.324	-0.651	220	2.232	-0.576	-2.336
181	-0.091	0.214	-1.199	221	1.828	1.893	1.298
182	0.201	0.197	-0.745	222	-0.470	0.998	0.551
183	0.423	1.750	1.365	223	0.310	-1.802	-1.050
184	1.115	-0.961	1.109	224	0.125	-0.855	-0.339
185	-1.901	-1.318	0.120	225	-0.852	-0.455	0.585
186	-1.936	-0.840	-0.181	226	0.610	0.197	0.447
187	0.953	0.753	0.490	227	-0.969	1.902	-0.413
188	-1.602	2.711	-0.771	228	-0.364	1.703	-0.890
189	1.284	-0.492	-0.492	229	-0.003	0.878	0.253
190	-1.526	-1.444	1.602	230	0.944	2.805	-0.265
191	-0.043	0.135	-0.999	231	-1.828	0.678	-0.195
192	-1.160	-1.630	-1.400	232	0.950	1.949	1.266
193	-0.235	-0.539	-0.283	233	-0.698	0.616	1.373
194	-0.873	0.301	0.422	234	-0.490	1.392	-0.391
195	1.061	-1.439	0.973	235	-0.277	0.760	-0.102
196	-0.826	0.674	-0.047	236	0.286	-0.324	-0.072
197	-0.175	-0.107	0.291	237	-0.565	2.887	-0.017
198	0.995	-1.230	-0.617	238	-1.312	-1.782	1.921
199	1.356	0.254	0.327	239	-0.455	-0.076	1.068
200	1.920	-0.272	-0.536	240	0.225	0.474	-0.315

**Appendix 12[contd] - Three-factor scores for all survey respondents for the
'financial reporting' concept**

Respondent	F1	F2	F3
241	-0.156	0.354	-0.661
242	0.409	1.570	-0.537
243	0.991	-0.269	-2.166
244	-0.137	2.278	-0.567
245	-0.412	0.203	0.684
246	-0.743	-1.062	0.805
247	-0.257	-1.407	0.166
248	1.829	0.222	-0.206
249	-0.374	-1.558	0.720

Appendix 13: Two-factor scores for all survey respondents for ‘democratisation’

Respondent	F1	F2	Respondent	F1	F2
1	-0.440	0.220	41	-0.355	-1.065
2	-1.061	1.169	42	1.894	-1.667
3	-1.261	-0.043	43	0.815	-0.763
4	-1.899	0.444	44	0.753	-2.644
5	0.936	0.392	45	-0.167	-1.092
6	1.146	0.352	46	-0.761	-1.801
7	0.643	0.160	47	1.130	-0.788
8	0.037	0.399	48	1.645	0.732
9	0.761	0.478	49	-1.476	-0.057
10	0.002	0.304	50	-0.727	-0.362
11	0.498	0.077	51	0.143	0.661
12	0.232	0.455	52	1.676	-0.323
13	-0.638	-1.466	53	0.923	1.649
14	0.418	1.109	54	-0.422	0.829
15	1.567	1.276	55	1.338	0.409
16	-1.665	-0.184	56	-2.009	-0.381
17	-0.751	1.097	57	1.048	0.052
18	0.678	0.642	58	1.368	-1.990
19	0.269	0.854	59	1.220	-0.847
20	-0.636	0.503	60	-0.185	-1.148
21	0.402	-0.040	61	-0.864	0.080
22	0.585	1.486	63	0.193	-0.750
23	-0.492	0.469	64	-0.128	-2.105
24	2.088	-1.514	65	-0.386	0.006
25	0.800	0.405	66	0.328	0.735
26	-1.232	0.871	67	-0.507	-0.543
27	-1.248	0.336	68	0.889	0.795
28	1.316	2.307	69	0.461	0.775
29	-0.530	0.817	70	-0.999	-0.353
30	0.084	0.622	71	0.852	0.050
31	-0.591	0.036	73	-0.536	-0.313
32	0.611	0.357	74	-0.452	1.734
33	0.076	2.039	75	-2.113	-0.537
34	0.880	-2.678	76	1.086	-0.033
35	0.729	0.378	77	-1.693	0.024
36	-0.279	0.399	78	-0.750	0.598
37	0.981	-0.356	79	0.795	1.494
38	1.283	0.817	80	0.399	-1.760
39	-0.719	-0.376	81	0.336	0.894
40	1.569	0.685	82	0.731	-0.158

**Appendix 13[contd] - Two-factor scores for all respondents for the
'democratisation' concept**

Respondent	F1	F2	Respondent	F1	F2
83	-0.821	-0.742	125	-0.895	-0.112
84	-0.291	-0.399	126	-0.867	0.698
85	-1.143	-0.313	128	-0.762	-0.610
86	1.561	0.580	129	1.326	-0.754
87	1.452	-0.736	130	0.468	1.404
88	1.000	-0.592	131	0.481	1.045
89	-0.058	1.218	132	1.101	-1.068
90	0.404	-2.236	134	0.780	0.137
92	-0.410	0.324	135	0.310	0.744
93	0.355	-0.049	136	0.166	-0.382
94	1.359	-0.599	137	-0.009	1.092
95	-1.093	-1.216	138	-0.686	1.402
96	0.146	1.044	139	1.278	-2.237
97	-0.319	1.678	140	-2.363	1.137
98	-0.393	1.226	141	-1.592	-0.157
99	0.368	0.146	142	-0.515	-0.670
100	1.293	-0.138	143	-0.563	-1.871
101	0.711	0.058	144	0.903	-0.897
102	-0.119	-2.261	145	-1.792	-0.900
103	-0.202	-1.183	146	-0.677	-0.572
104	0.727	0.615	147	-0.721	-0.082
105	1.884	-0.195	148	-0.173	-0.341
106	1.194	1.430	149	-0.640	0.653
107	1.316	2.307	150	-0.414	-0.429
108	0.409	-0.948	151	-1.921	0.804
109	0.923	-0.877	153	1.533	0.913
111	-0.427	0.522	154	0.574	0.539
112	1.106	-0.546	155	-0.787	0.842
113	-0.467	-1.371	156	0.022	-0.877
114	-0.906	0.088	157	-0.612	-0.202
115	1.522	-0.388	158	-2.426	-0.655
116	0.314	-0.385	159	-2.214	-0.366
117	0.943	0.537	160	-2.437	0.408
118	0.372	-0.476	161	0.009	0.758
119	-0.153	-0.146	162	-0.610	0.493
120	0.173	0.502	163	0.418	0.326
121	1.520	0.076	164	-0.050	0.597
122	0.239	0.695	165	-0.876	0.584
123	-0.645	0.251	166	-0.395	-0.407
124	-0.412	-0.331	167	-0.963	0.319

**Appendix 13[contd] - Two-factor scores for all respondents for the
'democratisation' concept**

Respondent	F1	F2
168	-0.462	-1.871
169	-0.778	-1.857
170	0.888	0.396
171	-0.887	0.406
172	-0.892	0.755
173	0.433	0.930
174	-0.215	-0.179
175	0.729	1.064
176	0.664	0.884
177	0.628	0.091
178	-2.569	-1.967
179	-0.417	-0.075
180	-0.168	-1.451
182	0.190	-0.357
183	0.354	1.456
184	0.700	1.293
185	0.042	-1.429
186	0.292	-0.927
187	0.367	1.067
189	-1.401	0.675
190	0.010	-0.917
191	-0.189	-1.045
192	0.425	-0.897
193	-1.330	1.875
194	-0.230	0.945
195	0.835	-0.873
196	-0.060	0.353
198	-1.719	-0.805
199	0.990	-0.529
200	-0.007	1.178
201	0.960	-0.390
202	-0.198	-1.009
203	-1.529	0.174
204	1.215	1.671
205	0.392	1.094
206	1.274	-2.741
207	0.581	-0.445
208	1.315	-1.126
209	-0.803	0.940
210	1.414	0.032

Respondent	F1	F2
211	1.012	0.990
212	-0.227	-1.094
215	-1.571	1.531
216	-1.364	-0.342
217	1.215	-2.016
218	0.826	1.961
219	-0.717	-0.166
220	1.149	-0.218
221	0.622	1.440
222	-1.932	0.249
223	0.432	0.593
224	-0.077	-2.524
225	-1.193	-0.028
226	0.083	0.176
227	0.972	1.700
229	-1.105	0.807
230	-1.254	0.812
231	-3.835	-0.656
232	-0.954	0.565
233	0.581	-0.545
234	-0.287	-0.789
235	-1.113	-0.194
236	-0.513	1.175
238	0.534	-1.022
239	0.392	0.905
240	-0.263	-0.134
241	0.366	-0.279
242	0.576	-0.627
243	0.422	-0.745
244	-0.944	-1.765
245	-0.903	-0.655
247	1.772	-0.989
248	-0.139	1.250
249	-0.891	0.436

Appendix 14: Descriptive statistical analysis of ‘democratisation’ groups based on median factor scores

Group	Count of respondents	Substantive response (average)	Substantive response (standard deviation)	Substantive response (skewness)	First factor average score	Second factor average score
1	64	3.31	0.93	-0.434	-0.828	-0.742
2	53	3.91	1.28	-1.258	0.916	-0.866
3	53	3.87	0.67	-0.586	-0.790	0.745
4	64	4.13	0.91	-1.137	0.723	0.842
All	234	3.79	1.02	-0.901	0.000	0.000

Refer to section 5.4.1.3. Values greater than the columnar value for ‘all’ respondents are highlighted in red. Values less than the columnar value for ‘all’ respondents are highlighted in green. There are higher than average scores for responses to the substantive assertion for groups two, three and four. For these groups, the higher scores for responses to the substantive assertion correspond to the first and second factor scores, at least one of which is greater than the respective median values. For group one, the below average score for responses to the substantive assertion corresponds to first and second factor scores, both of which are below the respective median values. These findings are indicative of possibly significant relationships between responses to the substantive assertion and factor scores for either or both of positivity and completeness of ‘democratisation’.

The skewness is negative for all groups. This is unsurprising given that a majority of survey respondents agree with the substantive assertion. However, the skewness is noticeably lower for groups two and four. This is attributable to the fact that these two groups include seven of the nine respondents who disagree strongly with the substantive assertion. These groups are otherwise populated predominantly by respondents who agree or agree strongly with the substantive assertion.

Appendix 14 [contd]: Descriptive statistical analysis of ‘democratisation’ groups based on median factor scores

The standard deviation values for all groups are below the average for ‘all’ respondents with the exception of group two. Group two’s relatively high standard deviation is attributable to the inclusion in this group of a higher proportion of respondents who ‘agree strongly’ or who ‘disagree strongly’ with the substantive assertion. This group’s membership includes six respondents who ‘disagree strongly’ with the substantive assertion and eighteen respondents who ‘agree strongly’ with the substantive assertion. A higher standard deviation value reflects a greater range of responses to the substantive assertion and therefore appears to indicate that group membership is not related to responses to the substantive assertion.

Appendix 15: Three-factor analysis of ‘XBRL’ concept for survey respondents who ‘agree strongly’ that ‘XBRL democratises financial reporting’

Correlations between variables and factors	F1	F2	F3
obscure-clear	0.795	0.112	-0.281
easy-difficult	0.788	-0.080	0.142
cumbersome-usable	0.759	0.261	-0.141
complex-simple	0.675	0.082	0.108
inefficient-efficient	0.509	0.445	0.075
helpful-unhelpful	-0.094	0.719	0.163
meaningful-meaningless	0.108	0.700	0.192
successful-unsuccessful	0.205	0.667	-0.265
strong-weak	0.102	0.633	0.334
unavailable-available	0.120	0.625	-0.480
believing-sceptical	0.189	0.569	0.174
productivity increasing-productivity decreasing	0.001	0.258	0.717
constraining-liberating	0.248	-0.005	0.609
democratising-not democratising	-0.296	0.190	0.382
powerful-impotent	0.477	0.187	0.249
Percentage of variance:	F1	F2	F3
Variability (%)	20.274	19.984	11.574
Cumulative variability (%)	20.274	40.258	51.832
Split-half correlations	F1	F2	F3
Three-factor structure	0.6453	0.9084	0.5060

Refer to section 5.6.1. ‘Agree strongly’ respondents perceive ‘XBRL’ primarily in terms of its usability. However, the split-half correlation for the F1 factor, at 0.6453 corroborates the relatively high standard deviations presented in Table 47 for this respondent group.

‘Agree strongly’ respondents do not appear to distinguish between the utility and availability of XBRL in the way that ‘all’ respondents make a distinction (see Table 25).

‘Agree strongly’ respondents perceive ‘XBRL’ in terms of its productivity enhancing capability, which in turn, is perceived to have a liberating effect. This factor supports the selection of the ‘agree strongly’ option in the substantive assertion.

Appendix 16: Three-factor analysis of ‘XBRL’ concept for survey respondents who ‘agree’ that ‘XBRL democratises financial reporting’

Correlations between variables and factors	F1	F2	F3
successful-unsuccessful	0.741	0.199	-0.280
helpful-unhelpful	0.654	-0.018	0.473
powerful-impotent	0.645	-0.245	0.203
strong-weak	0.629	0.013	0.285
meaningful-meaningless	0.620	0.038	0.306
productivity increasing-productivity decreasing	0.596	0.127	0.403
available-unavailable	0.550	0.176	0.027
simple-complex	-0.102	0.839	-0.012
easy-difficult	-0.040	0.825	0.165
usable-cumbersome	0.422	0.572	0.104
democratising-not democratising	0.089	-0.033	0.752
liberating-constraining	0.115	0.236	0.719
efficient-inefficient	0.403	0.284	0.511
believing-sceptical	0.359	0.050	0.325
clear-obscure	0.418	0.498	0.138
Percentage of variance:	F1	F2	F3
Variability (%)	23.395	14.994	14.596
Cumulative variability (%)	23.395	38.388	52.984
Split-half correlations	F1	F2	F3
Three-factor structure	0.6787	0.8784	-0.0819

Refer to section 5.6.1. The interpretive framework for ‘agree’ respondents is similar to that for ‘all’ respondents particularly for the first and second factors. The third factor suggests that ‘agree’ respondents perceive ‘XBRL’ in terms of its liberating and democratising capabilities. The prominence of this factor supports the selection of the ‘agree’ option in the substantive assertion.

Appendix 17: Three-factor analysis of ‘XBRL’ concept for survey respondents who ‘neither agree nor disagree’ that ‘XBRL democratises financial reporting’

Correlations between variables and factors:	F1	F2	F3
strong-weak	0.776	-0.045	0.095
successful-unsuccessful	0.768	0.368	-0.163
believing-sceptical	0.763	0.120	0.138
meaningful-meaningless	0.655	0.226	0.353
helpful-unhelpful	0.603	0.140	0.422
powerful-impotent	0.586	-0.307	0.252
available-unavailable	0.540	0.520	-0.220
simple-complex	-0.210	0.769	0.036
clear-obscure	0.204	0.717	0.089
easy-difficult	0.128	0.693	0.331
usable-cumbersome	0.482	0.682	0.205
liberating-constraining	-0.039	0.048	0.783
efficient-inefficient	0.184	0.259	0.741
democratising-not democratising	0.219	0.005	0.601
productivity increasing-productivity decreasing	0.462	0.237	0.340
Percentage of variance:	F1	F2	F3
Variability (%)	25.557	18.416	15.128
Cumulative variability (%)	25.557	43.973	59.101
Split-half correlations	F1	F2	F3
Three-factor structure	0.7780	0.8358	0.5990

Refer to section 5.6.1. The interpretive framework for ‘neither agree nor disagree’ respondents is similar in nature to the interpretive framework for ‘agree’ respondents. It is evident that these two groups of respondents perceive ‘XBRL’ in similar terms (see also Table 55, which confirms the commonality of scales between these two respondent groups).

Appendix 18: Three-factor analysis of ‘XBRL’ concept for survey respondents who ‘disagree strongly’ or ‘disagree’ that ‘XBRL democratises financial reporting’

Correlations between variables and factors:	F1	F2	F3
powerful-impotent	0.804	0.220	0.292
strong-weak	0.776	0.247	0.167
helpful-unhelpful	0.721	0.327	0.369
productivity increasing-productivity decreasing	0.693	-0.143	0.591
believing-sceptical	0.683	0.493	0.080
successful-unsuccessful	0.661	0.258	0.528
meaningful-meaningless	0.628	0.509	-0.020
inefficient-efficient	0.522	0.085	0.630
unavailable-available	0.138	0.767	0.153
democratising-not democratising	0.189	0.679	0.210
cumbersome-usable	0.440	0.646	0.287
obscure-clear	0.380	0.611	0.462
easy-difficult	0.119	0.552	0.605
complex-simple	0.118	0.256	0.715
constraining-liberating	0.227	0.393	0.562
Percentage of variance:	F1	F2	F3
Variability (%)	28.606	21.180	18.913
Cumulative variability (%)	28.606	49.785	68.698
Split-half correlations	F1	F2	F3
Three-factor structure	0.8767	0.5764	0.7597

Refer to section 5.6.1. The interpretive structure for the ‘disagree strongly or disagree’ respondent group is more complex than for the other respondent groups. A number of the scales correlate strongly with more than one factor, which makes it somewhat more difficult to interpret. This group of respondents appears to attribute the absence of democratisation to the complexity of XBRL and insufficient usability. Furthermore, in terms of the utility of XBRL, this group of respondents perceives ‘XBRL, in principle, as a positive development. In this regard, the ‘disagree strongly or disagree’ respondent is similar to the other respondent groups.

Appendix 19: Three-factor analysis of ‘financial reporting’ concept for survey respondents who ‘agree strongly’ that ‘XBRL democratises financial reporting’

Correlations between variables and factors	F1	F2	F3
adequate-inadequate	0.848	0.150	0.156
reliable-unreliable	0.820	0.190	0.176
reputable-disreputable	0.769	-0.025	0.124
informative-uninformative	0.682	0.022	0.059
honest-dishonest	0.659	0.096	0.210
democratic-undemocratic	0.654	0.297	0.172
beneficial-pointless	0.526	0.146	0.462
flexible-inflexible	-0.123	0.684	0.429
dynamic – static	0.186	0.670	0.177
simple – complex	0.242	0.613	-0.478
easy – difficult	0.057	0.592	-0.104
healthy – unhealthy	0.523	0.561	0.174
influential- not influential	0.122	0.245	0.754
powerful – impotent	0.378	-0.015	0.734
valuable – worthless	0.364	-0.085	0.718
Percentage of variance :	F1	F2	F3
Variability (%)	28.419	14.697	16.453
Cumulative variability (%)	28.419	43.116	59.568
Split-half correlations	F1	F2	F3
Three-factor structure	0.8441	0.8604	-0.2787

Refer to section 5.6.2. The majority of the scales that correlate strongly with the first two factors are similar to those that correlate strongly with the first two factors for ‘all’ respondents. The second and third factors for ‘all’ respondents are combined into a single second factor for ‘agree strongly’ respondents. A third factor, which could be reasonably labelled ‘influence’ is relevant to ‘agree strongly’ respondents. However, the split-half correlation for this factor indicates that it is unstable within the group.

Appendix 20: Three-factor analysis of ‘financial reporting’ concept for survey respondents who ‘agree’ that ‘XBRL democratises financial reporting’

Correlations between variables and factors:	F1	F2	F3
reliable-unreliable	0.836	-0.163	0.104
honest-dishonest	0.689	0.096	-0.082
healthy-unhealthy	0.689	0.191	-0.246
adequate-inadequate	0.677	0.142	-0.005
reputable-disreputable	0.670	0.180	0.001
informative-uninformative	0.544	0.226	0.172
beneficial-pointless	0.537	0.310	-0.162
flexible-inflexible	-0.039	0.803	0.015
dynamic-static	0.112	0.785	-0.015
valuable-worthless	0.399	0.495	-0.041
easy-difficult	-0.054	0.069	0.878
simple-complex	0.068	-0.004	0.848
democratic-undemocratic	0.083	0.459	0.022
influential-not influential	0.293	0.428	0.008
powerful-impotent	0.283	0.403	-0.381
Percentage of variance:	F1	F2	F3
Variability (%)	23.295	15.605	11.820
Cumulative variability (%)	23.295	38.900	50.720
Split-half correlations:	F1	F2	F3
Three-factor structure	0.9426	0.8900	0.8707

Refer to section 5.6.2. The interpretive structure for ‘agree’ respondents is very similar to that for ‘all’ respondents (see also Table 58). The split half correlations also show a high degree of stability.

Appendix 21: Three-factor analysis of ‘financial reporting’ for survey respondents who ‘neither agree nor disagree’ that ‘XBRL democratises financial reporting’

Correlations between variables and factors:	F1	F2	F3
pointless-beneficial	0.832	0.094	0.015
honest-dishonest	0.779	0.087	0.140
healthy-unhealthy	0.774	-0.117	0.204
valuable-worthless	0.773	0.220	-0.266
disreputable-reputable	0.625	0.309	0.105
impotent-powerful	0.562	0.455	-0.268
reliable-unreliable	0.162	0.778	0.062
informative-uninformative	0.222	0.759	-0.232
dynamic-static	0.266	0.634	0.290
flexible-inflexible	-0.173	0.547	0.120
complex-simple	0.099	-0.002	0.813
easy-difficult	0.235	0.129	0.683
inadequate-adequate	0.486	0.284	0.416
undemocratic-democratic	0.484	0.032	0.028
influential- not influential	0.378	0.018	-0.587
Percentage of variance:	F1	F2	F3
Variability (%)	27.053	15.750	13.447
Cumulative variability (%)	27.053	42.803	56.250
Split-half correlations:	F1	F2	F3
Three-factor structure	0.8525	0.7655	0.7027

Refer to section 5.6.2. The interpretive structure for ‘agree’ respondents is very similar to that for ‘all’ respondents (see also Table 58). The split half correlations also show a reasonably high degree of stability.

Appendix 22: Three-factor analysis of ‘financial reporting’ concept for survey respondents who ‘disagree’ or ‘disagree strongly’ that ‘XBRL democratises financial reporting’

Correlations between variables and factors:	F1	F2	F3
impotent - powerful	0.775	0.082	-0.132
disreputable - reputable	0.658	-0.010	-0.149
influential- not influential	0.599	0.062	0.357
informative - uninformative	0.561	0.579	-0.168
honest - dishonest	0.557	-0.115	0.318
dynamic - static	-0.093	0.779	0.111
flexible - inflexible	-0.381	0.692	0.183
reliable - unreliable	0.200	0.547	-0.217
valuable - worthless	0.077	0.020	0.803
pointless - beneficial	-0.027	-0.208	0.770
healthy - unhealthy	0.467	-0.260	0.530
undemocratic - democratic	0.454	0.391	0.192
inadequate - adequate	0.348	0.456	-0.365
complex - simple	-0.301	-0.167	-0.523
easy - difficult	0.226	-0.100	-0.698
Percentage of variance:	F1	F2	F3
Variability (%)	19.359	15.026	18.925
Cumulative variability (%)	19.359	53.310	38.284
Split-half correlations:	F1	F2	F3
Three factor structure	0.5741	0.3371	0.7034

Refer to section 5.6.2. Only three first factor scales are also first factor scales for ‘all’ respondents. The second factor has some similarities with the second factor for ‘all’ respondents but the split-half correlation is weak. The third factor is similar to the third factor for ‘all’ respondents regarding the complexity of ‘financial reporting’. However, the complexity is expressed, for ‘disagree strongly or disagree’ respondents, in terms of a negative correlation to the value and benefit of financial reporting.

Appendix 23: Two-factor analysis of ‘democratisation’ concept for survey respondents who ‘agree strongly’ that ‘XBRL democratises financial reporting’

Correlations between variables and factors:	F1	F2
good-bad	0.793	-0.027
vibrant-feeble	0.737	0.181
meaningful-meaningless	0.733	0.131
positive-negative	0.700	0.089
timely-untimely	0.581	0.056
real-imaginary	0.532	0.307
whole-partial	0.131	0.723
successful-unsuccessful	0.180	0.642
strong-weak	0.443	0.577
formed-formless	-0.053	0.566
complete-incomplete	0.161	0.556
society-individual	-0.090	0.547
certain-uncertain	0.436	0.505
active-passive	0.223	0.346
visible-invisible	0.164	0.189
Percentage of variance:	F1	F2
Variability (%)	22.465	18.425
Cumulative variability (%)	22.465	40.890
Split-half correlations:	F1	F2
Two-factor structure	0.7496	0.0486

Refer to section 5.6.3. For the two-factor structure, the correlations of scales to factors is similar to those for ‘all’ respondents. The split-half correlations are strong only for the first factor, which confirms that interpretations of ‘democratisation’ can become unstable beyond the first factor.

Appendix 24: Two-factor analysis of ‘democratisation’ concept for survey respondents who ‘agree’ that ‘XBRL democratises financial reporting’

Correlations between variables and factors:	F1	F2
positive-negative	0.819	0.090
good-bad	0.766	0.013
strong-weak	0.709	0.183
meaningful-meaningless	0.708	0.052
real-imaginary	0.570	0.379
visible-invisible	0.537	0.382
vibrant-feeble	0.537	0.009
successful-unsuccessful	0.251	0.829
complete-incomplete	0.016	0.786
formed-formless	0.006	0.592
certain-uncertain	0.413	0.580
whole-partial	0.443	0.577
active-passive	0.426	0.324
society-individual	-0.058	0.289
timely-untimely	0.368	-0.016
Percentage of variance:	F1	F2
Variability (%)	26.086	18.979
Cumulative variability (%)	26.086	45.066
Split-half correlations:	F1	F2
Two-factor structure	0.7447	0.5043

Refer to section 5.6.3. For the two-factor structure, the correlations of scales to factors is similar to those for ‘all’ respondents. The split-half reliability for individual respondent groups for the first factor is stronger than for the second factor.

Appendix 25: Two-factor analysis of ‘democratisation’ concept for survey respondents who ‘neither agree nor disagree’ that ‘XBRL democratises financial reporting’

Correlations between variables and factors:	F1	F2
positive-negative	0.831	0.318
meaningful-meaningless	0.823	0.260
strong-weak	0.819	0.318
real-imaginary	0.746	0.249
certain-uncertain	0.714	0.297
timely-untimely	0.708	0.147
vibrant-feeble	0.706	0.008
active-passive	0.666	-0.286
whole-partial	0.634	-0.064
successful-unsuccessful	0.609	0.546
good-bad	0.609	0.404
visible-invisible	0.501	0.247
society-individual	-0.159	0.729
complete-incomplete	0.143	0.536
formed-formless	0.231	0.497
Percentage of variance:	F1	F2
Variability (%)	40.281	14.114
Cumulative variability (%)	40.281	54.395
Split-half correlations:	F1	F2
Two-factor structure	0.6189	0.5664

Refer to section 5.6.3. Perceptions of ‘democratisation’ by this respondent group are expressed primarily in single factor terms. Comparatively few scales correlate strongly with the second factor. In terms of the variability in scale ratings, the first factor is far more significant. This interpretive structure indicates that ‘democratisation’ is perceived in basic terms by this respondent group.

Appendix 26: Two-factor analysis of ‘democratisation’ for survey respondents who ‘disagree strongly’ or ‘disagree’ that ‘XBRL democratises financial reporting’

Correlations between variables and factors:	F1	F2
real-imaginary	0.818	-0.122
vibrant-feeble	0.796	0.106
meaningful-meaningless	0.701	0.168
visible-invisible	0.664	0.015
positive-negative	0.614	0.319
successful-unsuccessful	0.596	0.588
complete-incomplete	0.552	-0.065
strong-weak	0.549	0.496
society-individual	0.063	0.737
active-passive	0.054	0.694
whole-partial	0.390	0.514
good-bad	0.392	0.299
certain-uncertain	0.403	0.262
timely-untimely	0.435	0.102
formed-formless	0.357	-0.619
Percentage of variance:	F1	F2
Variability (%)	29.095	17.304
Cumulative variability (%)	29.095	46.400
Split-half correlations:	F1	F2
Two-factor structure	0.7221	0.6032

Refer to section 5.6.3. Similar to other respondent groups, the interpretive structure for ‘disagree strongly or disagree’ respondents is relatively simple. Split-half correlations for this respondent group are strong, which indicates reasonable stability of the interpretive framework for this respondent group.

Appendix 27: Analyses of responses to the substantive assertion for each of (i) capacity in which respondents work with XBRL, (ii) respondent years of experience, and (iii) respondent age group

Percentages that are greater than the corresponding columnar percentage for all respondents are highlighted in red in each table.

(i) Capacity in which respondents work with XBRL

Capacity ⁹⁸	Agree strongly	Agree	Neither agree nor disagree	Disagree strongly or disagree	Total	Number of respondents
Regulator/government agency/analyst/investor relations	24%	44%	20%	12%	100%	66
Software tools/taxonomy developer	25%	41%	16%	18%	100%	61
Instance preparer	25%	40%	25%	10%	100%	20
Consultant/not for profit	20%	50%	20%	11%	100%	102
All	22%	45%	19%	13%	100%	249

The Chi-square outcome for the analysis by capacity in which respondents work with XBRL is $X^2(9, N=249) = 3.922$, $p = 0.9165$. The Kruskal-Wallis p-value is 0.9887 and the ANOVA p-value is 0.9640. The null hypothesis of no significant relationships between variables cannot be rejected.

(ii) Respondent years of experience

Years of experience	Agree strongly	Agree	Neither agree nor disagree	Disagree strongly or disagree	Total	Number of respondents
< 2	16%	53%	20%	11%	100%	55
> 2 and < 4	28%	38%	20%	13%	100%	60
< 4 and < 6	21%	50%	19%	10%	100%	58
> 6 and < 8	37%	37%	10%	17%	100%	30
> 8	15%	46%	24%	15%	100%	46
All	22%	45%	19%	13%	100%	249

The Chi-square outcome for the analysis by respondent years of experience is $X^2(12, N=249) = 10.644$, $p = 0.5597$. The Kruskal-Wallis p-value is 0.4893 and the ANOVA

⁹⁸A number of the original categories are combined in order to meet the table cell requirements for statistical testing.

Appendix 27 [contd]: Analyses of responses to the substantive assertion for each of (i) capacity in which respondents work with XBRL, (ii) respondent years of experience, and (iii) respondent age group

p-value is 0.6403. The null hypothesis of no significant relationships between variables cannot be rejected.

(iii) Respondent age group

Age group ⁹⁹	Agree strongly or agree	Neither agree nor disagree	Disagree strongly or disagree	Total	Number of respondents
under 35	70%	20%	10%	100%	50
36 to 55	66%	19%	15%	100%	169
over 55	73%	20%	7%	100%	30
All	68%	19%	13%	100%	249

The Chi-square outcome for the analysis by respondent age group $X^2(4, N=249) = 1.966$, $p = 0.7420$. The Kruskal-Wallis p-value is 0.3598 and the ANOVA p-value is 0.4311. The null hypothesis of no significant relationships between variables cannot be rejected.

⁹⁹A number of the original categories are combined in order to meet the table cell requirements for statistical testing.

Appendix 28: Osgood, et al.,'s (1957) semantic differential scales sourced from Roget's Thesaurus

	Bi-polar scale	
1	good	bad
2	optimistic	pessimistic
3	complete	incomplete
4	timely	untimely
5	altruistic	egotistic
6	sociable	unsociable
7	kind	cruel
8	grateful	ungrateful
9	harmonious	dissonant
10	clean	dirty
11	light	dark
12	graceful	awkward
13	pleasurable	painful
14	beautiful	ugly
15	successful	unsuccessful
16	high	low
17	meaningful	meaningless
18	important	unimportant
19	progressive	regressive
20	true	false
21	positive	negative
22	reputable	disreputable
23	believing	sceptical
24	wise	foolish
25	healthy	sick
26	hard	soft
27	strong	weak
28	severe	lenient
29	tenacious	yielding
30	constrained	free
31	convergent	divergent
32	heavy	light
33	serious	humorous
34	opaque	transparent
35	large	small
36	masculine	feminine
37	active	passive
38	excitable	calm

Appendix 28 [contd]: Osgood, et al.,'s (1957) semantic differential scales sourced from Roget's Thesaurus

	Bi-polar scale	
39	hot	cold
40	intentional	unintentional
41	fast	slow
42	complex	simple
43	sober	drunk
44	stable	changeable
45	rational	intuitive
46	sane	insane
47	cautious	rash
48	orthodox	heretical
49	angular	rounded
50	straight	curved
51	sharp	blunt
52	new	old
53	certain	uncertain
54	youthful	mature
55	savoury	tasteless
56	refreshed	weary
57	colourful	colourless
58	interesting	boring
59	pungent	bland
60	sensitive	insensitive
61	aggressive	defensive
62	ornate	plain
63	near	far
64	heterogeneous	homogeneous
65	tangible	intangible
66	inherent	extraneous
67	wet	dry
68	symmetrical	asymmetrical
69	competitive	cooperative
70	formed	formless
71	periodic	erratic
72	sophisticated	naive
73	public	private
74	humble	proud
75	objective	subjective
76	thrifty	generous

Appendix 29: Semantic differential scales sourced from accounting literature

	Bi-polar scale	
1	exact	estimated
2	measurable	immeasurable
3	real	imaginary
4	direct	indirect
5	informative	misleading
6	general	specific
7	beneficial	adverse
8	safe	risky
9	available	unavailable
10	planned	unplanned
11	expected	unexpected
12	controllable	uncontrollable
13	long term	short term
14	permanent	temporary
15	cumulative	non-cumulative
16	flexible	inflexible
17	variable	constant
18	necessary	unnecessary
19	required	discretionary
20	committed	uncommitted
21	current	past
22	productive	unproductive
23	immediate	remote
24	common	uncommon
25	costly	inexpensive
26	adequate	inadequate
27	accountable	unaccountable
28	influential	not influential
29	valuable	worthless
30	honest	dishonest
31	easy	difficult
32	dynamic	static

Appendix 30: Semantic differential scales sourced from information systems literature

	Bi-polar scale	
1	delightful	disgusting
2	merry	sad
3	superfluous	indispensible
4	intimate	extraneous
5	stressful	relaxing
6	satisfactory	frustrating
7	powerful	impotent
8	superficial	deep
9	cold	warm
10	desirable	undesirable
11	liberating	constricting
12	efficient	inefficient
13	performance enhancing	performance degrading
14	productivity increasing	productivity decreasing
15	effective	ineffective
16	helpful	unhelpful
17	clear	obscure
18	flexible	rigid
19	usable	cumbersome
20	unlikely	likely
21	superior	inferior
22	warranted	unwarranted
23	vigorous	feeble

Appendix 31: Test for significant relationship between responses to the substantive assertion and number of requests to participate in the survey

Percentages that are greater than the corresponding columnar percentage for all respondents are highlighted in red

Requests	Agree strongly	Agree	Neither agree nor disagree	Disagree strongly or disagree	Total	Number of respondents
One	16%	50%	21%	13%	100%	140
Two	28%	43%	18%	10%	100%	88
Three	38%	24%	14%	24%	100%	21
All	22%	45%	19%	13%	100%	249

The Chi-square outcome is $X^2(6, N=249) = 12.592, p = 0.0679$. The p-value exceeds the threshold of 0.05. Consequently, the null hypothesis of no significant relationship between the number of requests sent to a participant and the participant's response to the substantive assertion cannot be rejected.