Exploring the role of technology acceptance in business buying of tax technology

A thesis submitted to The University of Manchester for the degree of Doctor of Business Administration in the Faculty of Humanities

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ABSTRACT

Name of the University: The University of Manchester
Candidate’s Name: Paul Smith
Degree Title: Doctor of Business Administration
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Date: 21 February 2014

This study developed and empirically examined a model to help understand how key individuals in businesses decide on whether or not to buy and utilise technology in the context of managing their obligations in relation to business taxes. In restricting the frame of reference to a taxation context, it enabled a link to be made to individual decision making, as it is ordinarily the case that one lead buyer is evident in the context of tax and technology in organisations.

The model was developed from a review of extant literature in the areas of technology acceptance, behavioural intention, and consumer and business buying models. The overall model was built on a framework that has at its core the Augmented Technology Acceptance Model (Taylor & Todd, 1995a). A correspondence between attitude to use of the technology and product quality is theorised, allowing a connection to a wider model of purchase intention. The initial model was developed with thirteen hypotheses, ultimately leading to an examination of intention to buy tax technology.

After an initial pilot study, in the main study a questionnaire was designed to capture empirical data for measurements related to the model. Data collected from 125 informants (i.e. senior tax staff in large organisations) about tax technology buying decisions they were currently considering was used to empirically test the model, using Structural Equation Modelling. The low sample size caused a need to simplify the original model to retain statistical power. This had the result of reducing the number of hypotheses to ten. The analysis was performed testing the measurement model and the model fit and thereby investigating its underlying hypotheses.

The results supported the key hypotheses and the overall explanatory power of the model in examining intention to buy tax technology was strong. The use of technology acceptance principles as core to helping explain buying intention for tax technology was strongly supported. Only one hypothesis was not supported, relating to a proposed positive relationship between Relationship Quality and Intention to Buy constructs. Potential explanations for this finding with regard to relationship quality were introduced. The general research contributions and implications of the study were also discussed.
DECLARATION

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DEDICATION

To my wife, Elaine, and children, Peter and Alexandra, and whose love and support made this possible.

To my mother, who would have wanted nothing more than to see this work completed and enjoy with me the resulting sense of achievement. To my father, for his ongoing encouragement and advice.

To the rest of my family and colleagues, who have encouraged and supported me throughout.
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1. CHAPTER 1: INTRODUCTION

1.1 Introduction

This research is grounded in the context of professional services and the accountancy profession, and in particular taxation services. In the UK alone the market for taxation related services is approximately £4bn annually (Hughes, 2013). Growth in the market for accountancy services in general (including taxation services) is expected to be of the order of 20% between 2013 and 2017 (compound growth of over 4.5% per annum), leading to a total UK market for accountancy services of £29bn annually in 2017 (Hughes, 2013). Anticipated taxation service growth between 2013 and 2017 is a more modest 13% (compound growth of around 3% per annum) (Hughes, 2013).

Despite the overall anticipated growth in the market for taxation services described above, there is a significant shift in the nature of the types of taxation service that companies are demanding. This is driven principally by external forces such as regulation and public opinion on tax avoidance and on profit shifting in relation to corporate taxation (Hughes, 2013). It is also driven by the shift in the balance of taxation revenues for governments shifting from direct to indirect forms of taxation. This is illustrated by movements in tax rates. Between 1995 and 2008, the average European VAT rate has risen from 19.25% to 21.25%, whilst corporate tax rates have fallen from 35% to 23% (Hemmelgarn, 2013).
One key shift is an increase in services related to the management of tax compliance and tax reporting. This is a significant proportion of revenues within the tax practices of professional firms. Technology is an important part of the management of tax compliance and tax reporting. It is also a critical part of managing indirect taxes due to their transactional nature and the frequency and complexity of reporting associated with those taxes. Increasingly, professional service firms are either advising clients on what technology to buy and how best to use it in the above context, or are providing technology to their clients in order for clients to manage their tax obligations.

This research has the overall objective of identifying a model to help understand how key individuals in businesses decide on whether or not to buy and utilise technology in the context of managing their business tax obligations. In restricting the frame of reference to a taxation context, it enables a link to be made to individual decision making, as it is ordinarily the case that one lead buyer is evident in the context of tax and technology in organisations. However, it is important to control for the potential impact of the procurement function’s involvement, and the influence of and controls imposed by others in the decision making process.

Additionally, the lead tax decision maker (typically the Head of Tax or Tax Director) is also someone who will use or be technically capable of using the
technology under consideration. The fact that the decision is being made by a buyer who will also consider the technology from a personal use perspective allows the link to technology acceptance to be made. Technology acceptance refers to a process whereby an individual develops an attitude to the technology, forms an intention to use that technology and subsequently actually uses that technology (King & He, 2006; Rouse, 2004). The Technology Acceptance Model ("TAM") is a reference to a theoretical model first identified by Davis (1986), grounded in the Theory of Reasoned Action (Chuttur, 2009).

This situation (a technology buyer in an organisational context, who is a potential user) is not uncommon in organisational buying of technology products. Similar patterns have been observed in other forms of technology purchase, such as technology enabling logistics automation (Dadzie et al., 1999) and copier technology (Tanner Jr, 1998). The situation is, however, far more common in the simplified scenario where a buyer is an individual consumer.

In the organisational buying literature, the type of buying decision approach relating to tax technology described above has been referred to as ‘Judgmental New Task’ (Bunn, 1993). Typically a tax technology purchase is quite important but not extremely important as an organisational decision, and is typically based on a narrow set of supplier choices. The buying decision relies
on a careful understanding of the nature of the impact of the technology on processes and functionality that the technology will bring relative to potential user requirements. This fits the characteristics of ‘Judgmental New Task’ as described by Bunn (1993), and will typically result in limited reliance on established formal buying procedures.

1.2 Contribution

In relation to business to business purchases of technology, Forman et al. (2007) assert that research into the user’s role in influencing the final buying decisions related to high technology products (such as specialist information technology) has been limited with the exception of Dadzie et al. (1999). There is, of course, general research in relation to the role of users in the buying centre, examples include role theory analysis (Jackson & Sciglimpaglia, 1974) and influence pattern testing (Kohli & Zaltman, 1988). Additional research on the impact of the user’s perspective in the formation of a high technology business buying decision will make a contribution to knowledge in this area.

As described above, it would seem that in the context of organisational buying of technology offerings, where the technology relates specifically to one internal function such as tax, the buying decision will be made by individuals who are typically future users of the technology. This links the buying decision to technology acceptance. However, research into technology acceptance specifically in the context of taxation software for use by taxation specialists is very limited – only McLeod and Pippin (McLeod & Pippin,
2012; Mcleod et al., 2009b; Mcleod et al., 2009a; Pippin et al., 2010) could be identified as having published in an established journal and specifically commenting on professional tax software users. Additional studies as to acceptance of tax technology by tax specialists will make a useful contribution to the technology acceptance domain.

Additionally, research into business level acceptance or organisational adoption of technology as opposed to individual acceptance within an organisation is rare, but not entirely new - see for example Yu and Tao (2007), Theodosiou & Katsikea (2012) and Frambach and Schillewaert (2002). It has been asserted by Yu and Tao (2007) that technology acceptance at the organisational level has not yet been explored in sufficient detail. There are some exceptions such as the Yu and Tao study and a study on technology acceptance in the context of an ERP implementation (Amoako-Gyampah & Salam, 2004). This research helps extend the examination of business level acceptance of technology.

This study will look at a buying model for technology examining the relative importance of the attributes of the technology and other factors, such as price and quality of the relationship with the vendor of the technology. To do this ‘Attitude to Use’ will be examined as a potential substitute for the quality of the product in traditional buying models. This has Attitude to Use as a construct representing an individual’s attitude to the behaviour that is use of the particular system or software (Davis, 1993). Zeithaml (1988) has argued
that perceived product quality is equivalent to attitude to the product, which appears equivalent to attitude to use. Additional empirical examination of the effectiveness of Attitude to Use as a proxy for product quality will make a contribution to knowledge in this area.

Finally, in this study, a theoretical model of buying behaviour will be examined which is a unique combination of theoretical components drawn from earlier theories. This model will be assessed in relation to its ability to explain intention to buy software through the use of Structural Equation Modelling. If this model appears valid and has explanatory power, then it may be a useful organisational tool for examining the buying decision process in organisations both for tax specifically and potentially in wider circumstances. This will make a clear management contribution for organisations interested either in selling technology, or understanding how best to manage the buying of technology.

1.3 Research Objectives and Questions

The research objectives are explored below. These are the general guiding aims for the study. The specific research questions necessary to progress the research objectives are then defined.

1.3.1 Research Objectives
There are three key research objectives in this study. Firstly and primarily, the research objective is to examine the extent to which a buying decision in relation to tax technology is linked to Attitude to Use of the technology formed in the mind of the lead decision maker. Success in this objective relies upon a number of prerequisites, which are captured in the other two key objectives below. These relate to the appropriateness of use of the Technology Acceptance Model principles in an organisational buying context, and the applicability of buying theories developed in a single consumer context for certain business buying scenarios.

On this basis, the second research objective is to show that the Technology Acceptance Model principles appear to explain Attitude to Use in an organisational buying context, and are appropriate in the context of tax technology. It is worth noting that tax technology is being bought in a ‘professional’ context which might impact on the empirical results derived from use of the Technology Acceptance Model. In the research by Mcleod et.al. (2009b) which uses the Unified Theory of Acceptance and Use of Technology model (Venkatesh et al., 2003), it was found that only the perception of how well the software would perform had a significant relationship with intention to use the software.

The third and final research objective is to examine the appropriateness of utilising consumer based theoretical models of intention to buy in a business.
and organisational context. Specifically, the study seeks to show that inclusion of relationship quality in the theoretical model tested, together with other measures, will enable a consumer based model to adequately explain a business buying scenario. The importance of relationships to marketing and buying processes, particularly in relation to business to business transactions and service industries, is now firmly established (Håkansson, 1982) and has been the subject of much empirical research (Ford et al., 2006).

In summary, the main objectives of this study can be outlined as follows:

1. To examine the extent to which a buying decision in relation to tax technology is linked to Attitude to Use of technology.
2. To show that the Technology Acceptance Model principles appear to explain Attitude to Use in an organisational buying context, and are appropriate in the context of tax technology.
3. To show that the inclusion of relationship quality in the theoretical model tested will enable a consumer based model to adequately explain a business buying scenario.

1.3.2 Research Questions

The first two research questions seek to operationalise the second research objective and are follows:

1. Does the technology acceptance model appear to be supported in the context of tax technology?
2. Does the technology acceptance model appear to be supported in the context of organisational buying?

The next research question seeks to operationalise the third research objective and is as follows:

3. Does relationship quality influence intention to buy in the context of organisational buying of tax technology?

The next two research questions seek to operationalise the first research objective and are as follows:

4. Is Attitude to Use of the technology by the lead individual in the buying decision related positively to perceived value for money of the technology?

5. Where Perceived Value for Money is positively related to Attitude to Use, is there a clear relationship between Perceived Value for Money and Intention to Buy the technology?

Finally, the last research question drawing together all of the above as follows:

6. Can all of the relationships addressed above operate within a single explanatory model of Intention to Buy technology in a tax technology context?

1.4 Study Methodology
The methodology for the study was primarily quantitative in nature. The approach undertaken was in two parts, the pilot study and the main study. Both studies contribute to the research objectives described above, however, the pilot study was focused solely on the first research question:

*Does the technology acceptance model appear to be supported in the context of tax technology?*

In the pilot study, a series of hypotheses based on the Technology Acceptance Model (Davis, 1986) were developed. These hypotheses were tested using Structural Equation Modelling. SEM is a highly utilised and sophisticated statistical technique allowing researchers to examine theory driven causal research questions, at both latent and observed variable level (Hancock & Mueller, 2006). The data for the above analysis were collected via web based questionnaires from a sample of individuals in UK organisations using an on-line tax news and information website provided free of charge to subscribers by a major accounting organisation.

In the main study, a complex series of hypotheses were developed as part of a research model combining the Augmented Technology Acceptance Model (Taylor & Todd, 1995a), consumer buying models and relationship quality. These hypotheses were tested using structural equation modelling. In the main study, data for the analysis was collected from organisations utilising web based questionnaires. The sampling and data gathering process was
complex and challenging and is described fully in this thesis in Chapter 6 below. As will be described there, substantial difficulties in collecting the data resulted in a slightly modified nomological model.

The model tested in the main study allows all of the research questions set out above to be tested in one analysis through statistical analysis of the structural model and related hypotheses. In this regard, testing both the individual hypotheses and overall model fit is critical to ensure that in particular the sixth research question is addressed:

*Can all of the relationships addressed above operate within a single explanatory model of intention to buy technology in a tax technology context?*

### 1.5 Structure of the Thesis

The structure of this thesis is organized as a series of 9 chapters, the first chapter being this introduction. Figure 1 below shows the organisational structure of the study in diagrammatic form.

Chapter 2 provides a review of the literature in relation to technology acceptance and adoption, focusing on the Technology Acceptance Model, and its roots in behavioural psychology and decision making theories such as the Theory of Reasoned Action and Theory of Planned Behaviour. It explores alternative theoretical frameworks for technology acceptance. Chapter 2 also
reviews briefly models of business and consumer based buying, and examines constructs in the literature for relationship quality.

Chapter 3 outlines the purpose of the research and develops the research model, outlining the key research questions and developing research hypotheses to address those key research questions. In Chapter 3 all of the key constructs or research variables are developed in the context of the overall research model, and the relationships between those variables are the research hypotheses. These are all grounded in the theories examined in the literature review.

Chapter 4 builds on Chapter 3 by outlining the chosen research methodology and developing a structural model and measurements for the variables in the model. Chapter 4 also discusses the data collection and sampling approach and introduces the concept of Structural Equation Modelling. It goes on to describe key principles in relation to testing both the measurement model and structural model in Structural Equation Modelling. Chapter 4 then introduces the pilot study undertaken before the main study.

Chapter 5 describes in detail the pilot study, its results and conclusions drawn. The pilot study was an examination of the applicability of the Technology Acceptance Model in the context of intention to use a free Internet technology provided in a tax context. The study includes development of an appropriate
measurement and structural model and examination of these using Structural Equation Modelling principles.

Chapter 6 describes the process of collecting data in relation to the main study and some of the challenges faced. It describes the challenges in collecting an adequate sample size and outlines the approach undertaken to manage the risk of inadequate sample size on statistical power of the structural equation model. It describes the adjustments made to the structural model based on this analysis.

Chapter 7 outlines the examination made of the collected data and the analysis made of the measurement model in relation to the main study.

Chapter 8 discusses the examination of the overall model fit for the initial structural equation model, and model modification and testing. It outlines the final model and discusses conclusions drawn.

Chapter 9 concludes the thesis, outlining key findings of this research, contributions made, managerial implications and potential implications for future research.

The structure of the thesis is illustrated in Figure 1 below:
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<th>Data Analysis</th>
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2. CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This study examines the role of technology acceptance in business buying of tax technology and related services. Technology acceptance studies seek to identify factors that cause individuals to accept and make use of systems (King & He, 2006). One of the longest established and most tested models in the field is the Technology Acceptance Model (TAM). TAM has proven to be a useful theoretical model, tested in many empirical research projects and repeatedly yielding statistically reliable results as described by Legris et al. (2003). Since its introduction, TAM has been cited over 5000 times in subsequent studies (Autry et al., 2010).

TAM, however, was derived from an earlier and more generic model of intention forming in human behaviour – the Theory of Reasoned Action (TRA) (Fishbein, 1967). The Theory of Planned Behaviour (TPB) (Ajzen, 1985) later extended the TRA (Rouse, 2004) and became the basis for similar extensions to TAM such as the Augmented Technology Acceptance Model (Taylor & Todd, 1995a). Given that theory related to human behaviour and rational decision making is the foundation for TAM, literature relating to this area is discussed first below, followed by a broad review of the Technology Acceptance literature. A table outlining the approach undertaken in the form of a timeline is set out below.
Table 1: Development of Technology Acceptance Research Timeline

<table>
<thead>
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<th>Year</th>
<th>Theory / Model</th>
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<tbody>
<tr>
<td>1967/1975</td>
<td>Theory of Reasoned Action (TRA)</td>
<td>(Fishbein, 1967; Fishbein &amp; Ajzen, 1975)</td>
<td>Fishbein introduces the Theory of Reasoned Action – which TAM is later based upon. (See 2.2.1 below)</td>
</tr>
<tr>
<td>1985/1986</td>
<td>Theory of Planned Behaviour (TPB)</td>
<td>(Ajzen, 1985; Ajzen &amp; Madden, 1986)</td>
<td>Extends the TRA by including concept of Perceived Behavioural Control. Augmented TAM (see below) extends TAM for TPB concepts. (See 2.2.2 below)</td>
</tr>
<tr>
<td>1989</td>
<td>Technology Acceptance Model (TAM)</td>
<td>(Davis et al., 1989)</td>
<td>An alternative formulation of TAM inserting Behavioural Intention between Attitude to Using Technology and Actual Use. (See 2.3.1 below)</td>
</tr>
<tr>
<td>1995</td>
<td>Augmented TAM</td>
<td>(Taylor &amp; Todd, 1995a)</td>
<td>An extended formulation of TAM adding Subjective Norm (SN) and Perceived Behavioural Control (PBC) from TPB. (See 2.3.2 below)</td>
</tr>
<tr>
<td>1996</td>
<td>Technology Acceptance Model (TAM)</td>
<td>(Venkatesh &amp; Davis, 1996)</td>
<td>Final version of the TAM model, which does not take into account SN or PBC. (See 2.3.1 below)</td>
</tr>
<tr>
<td>2000</td>
<td>Technology Acceptance Model 2 (TAM2)</td>
<td>(Venkatesh &amp; Davis, 2000)</td>
<td>Extends the final version of TAM for SN and for determinants of Perceived Usefulness’ but does not take into account PBC. (See 2.3.3 below)</td>
</tr>
<tr>
<td>2008</td>
<td>Technology Acceptance Model 3 (TAM3)</td>
<td>(Venkatesh &amp; Bala, 2008)</td>
<td>Extends TAM2 for determinants of ‘Perceived Ease of Use’ (See 2.3.3 below)</td>
</tr>
</tbody>
</table>
The literature in relation to Consumer Buying models is then examined. The common link from TAM to Consumer Buying is reviewed through literature describing studies using the Theory of Planned Behaviour. The use of the Theory of Planned Behaviour to investigate consumer buying is discussed, for example in literature in relation to on-line buying behaviour (Hansen et al., 2004). A particular study of the Theory of Planned Behaviour supporting its use to help explain buying behaviour both in an individual consumer and selling firm context is explored (De Canniere et al., 2007). Finally, literature in relation to perceived value for money in a consumer buying context is examined, for example, in a retail context (Sweenet et al., 1999).

Next, the link from consumer buying to organisational buying is explored. Literature supporting the argument that consumer buying and organisational buying are closely related in certain contexts is examined (Wilson, 2000). The argument for looking at similarities between consumer and organisational buying behaviour is explored (Fern & Brown, 1984). The applicability of consumer buying models to organisational settings and vice versa was also recognised by Wind (1978).

Common organisational buying models are then reviewed, for example, the Buyphase (later known as Buyclass) framework of Robinson, Faris and Wind (1967). The literature review then considers literature relating to business relationships as an important facet of business to business marketing, and considers the concept of Relationship Quality.
2.2 Decision Making in Behavioural Psychology

The Theory of Reasoned Action and the Theory of Planned Behaviour are reviewed individually and then criticisms of them and their alternatives are discussed below.

2.2.1 Theory of Reasoned Action

As outlined above, the Technology Acceptance Model was derived from the Theory of Reasoned Action (Davis, 1986). The Theory of Reasoned Action is a model of behavioural intention formation first developed by Fishbein (1967). The Theory of Reasoned Action has been described as one of the most fundamental and influential theories of human behaviour (Venkatesh et al., 2003). According to Fishbein & Ajzen (2011) over 1000 empirical papers utilising the Theory of Reasoned Action have appeared in professional journals in the last three decades. A meta analysis by Sheppard et al. (1988) found strong support for the predictive capability of the Theory of Reasoned Action model.

It has been used to consider a wide range of different forms of human behaviour. Examples include intention to vote in a given way, intention to lose weight or exercise, intention to use medicines or drugs and intention to buy items (Sheppard et al., 1988).
An example list of empirical studies concerning purchase intentions is set out below in Table 2 based on a review of the literature:

Table 2: Purchase Intention and Theory of Reasoned Action

<table>
<thead>
<tr>
<th>Behavioural Intention</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase brand of soft drink</td>
<td>(Miniard et al., 1982)</td>
</tr>
<tr>
<td>Purchase brand of grape drink</td>
<td>(Bonfield, 1974)</td>
</tr>
<tr>
<td>Eat at a fast food restaurant</td>
<td>(Brinberg &amp; Durand, 1983)</td>
</tr>
<tr>
<td>Online grocery buying</td>
<td>(Hansen et al., 2004)</td>
</tr>
<tr>
<td>Purchase prescription drugs</td>
<td>(Brinberg &amp; Cummings, 1984)</td>
</tr>
<tr>
<td>Purchase a car</td>
<td>(Raju &amp; Bhagat, 1975)</td>
</tr>
<tr>
<td>Purchase stock via Internet</td>
<td>(Ramayah et al., 2009)</td>
</tr>
<tr>
<td>Rent a video</td>
<td>(Madden et al., 1992)</td>
</tr>
</tbody>
</table>

In the model, it is argued that actual behaviour will result from the formation of a behavioural intention (BI), provided that the individual is capable of behaving voluntarily. Behavioural intention has been defined by Fishbein & Ajzen (1975) as an individual’s subjective assessment of the probability that they will perform a specified behaviour. It further argues that behavioural intention will be determined by the attitude to the given act (itself formed by expectations and evaluations of consequences of that act) and subjective norm.
this being the perception of the views of important others to the performance of the behaviour (Madden et al., 1992).

The theory states that an individual’s intention to carry out a particular behaviour may be influenced by the normative social beliefs held by the individual. This is the Subjective Norm concept. As an example, an individual might have a very favourable attitude toward having a drink before dinner at a restaurant. However, the intention to actually drink may be influenced by the individual’s beliefs about the appropriateness (i.e. the perceived social norm) of ordering a drink in the current situation and his/her motivation to comply with those normative beliefs (Hansen et al., 2004).

The Theory of Reasoned Action takes a parsimonious and formulaic approach to the assumed way in which an intention to behave is formed. The formulas created by Fishbein & Ajzen (1975) are as follows:

1. \( B \approx BI_{ACT} = W_1 A_{act} + W_2 SN_{act} \)

where \( B \) is Behaviour, \( BI \) is Behavioural Intention, \( W_1 \) and \( W_2 \) are importance weights, \( A_{act} \) is Attitude towards behaviour \( B \) and \( SN_{act} \) is the subjective norm regarding behaviour \( B \).

2. \( A_{act} = \sum_{i=1}^{n} b_i e_i \)

where \( b_i \) is belief that performing behaviour \( B \) will have consequence \( i \), and \( e_i \) is the evaluation of consequence \( i \), and \( n \) the number of salient beliefs.
3. $SN_{act} = \sum_{j=1}^{m} nb_j mc_j$

where $nb_j$ is the normative belief that person $j$ wants the subject to perform behaviour $B$, $mc_j$ is motivation to comply with person $j$ and $m$ is the number of persons influencing the subject.

Figure 2: Theory of Reasoned Action (from Davis et al., 1989)

In the Theory of Reasoned Action, Fishbein’s Subjective Norm usually has weak predictive power and high multicollinearity with Attitude constructs (Warshaw, 1980) as evidenced in empirical research (Glassman & Fitzhenry, 1976). According to Armitage (2001), some researchers have therefore excluded it from analysis.

The Theory of Reasoned Action has one fundamental weakness in the sense that it looks only at voluntary behaviour, and often behaviour may not be completely under the individual’s control (Sheppard et al., 1988). This
deficiency of the model is specifically addressed in the Theory of Planned Behaviour which extends the boundary condition of voluntariness (Madden et al., 1992).

2.2.2 Theory of Planned Behaviour

The Theory of Planned Behaviour was first introduced by Ajzen (1985) and then theoretically tested by Ajzen and Madden (1986). It seeks to extend Theory of Reasoned Action (TRA) to deal with the weakness described in relation to TRA above – its failure to take into account the individual’s perception that they cannot carry out the behaviour concerned due to external factors (Ajzen, 1991). This perception is referred to as Perceived Behavioural Control. Perceived Behavioural Control is described as an individual’s perceived control over non-motivational factors such as availability of requisite opportunities and resources (Ajzen & Madden, 1986).

Testing of the Theory of Planned Behaviour (TPB) against Theory of Reasoned Action has supported its improved explanatory power (Madden et al., 1992) with perceived behavioural control affecting both intentions and behaviour (Armitage, 2001). When the situation allows an individual to have complete control over behavioural performance, intentions alone should be sufficient to predict behaviour, as specified in the TRA. The inclusion of analysis of Perceived Behavioural Control should become increasingly useful as complete personal control over the behaviour declines (Ajzen, 1991).
The Theory of Planned Behaviour is illustrated in Figure 3 below. The Theory of Planned Behaviour has (like the Theory of Reasoned Action) been widely used in examining purchase intention. See the example references in Table 3 below.

Figure 3: Theory of Planned Behaviour (Ajzen & Madden, 1986)
Table 3: Purchase Intention and Theory of Planned Behaviour

<table>
<thead>
<tr>
<th>Behavioural Intention</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase ‘green’ products</td>
<td>(Kalafatis et al., 1999)</td>
</tr>
<tr>
<td>Purchase home computers</td>
<td>(Venkatesh &amp; Brown, 2001)</td>
</tr>
<tr>
<td>Purchases via the Internet</td>
<td>(George, 2004)</td>
</tr>
<tr>
<td>Online grocery purchases</td>
<td>(Hansen et al., 2004)</td>
</tr>
<tr>
<td>Investing in shares</td>
<td>(East, 1993)</td>
</tr>
</tbody>
</table>

2.2.3 Challenges to and evaluation of TRA and TPB

Both the Theory of Reasoned Action and the Theory of Planned Behaviour have been challenged as to whether they have sufficient explanatory power – the challenge to a sufficiency assumption which concerns whether additional predictors are required (Conner & Armitage, 1998) and as to whether biases and emotions are adequately accounted for (Wolff et al., 2011).

Biases and emotions are argued by Ajzen (2011) to already be adequately catered for in the theories of Reasoned Action and Planned Behaviour, since they merely affect beliefs and assumed consequences. Much work has been done to investigate bias and heuristics (simplifying rules or strategies) in behavioural psychology (Kahneman et al., 1982). A heuristic linked to emotional bias is the concept of affect heuristic, where a person’s emotional attitude can drive beliefs about benefits and risks (Finucane et al., 2000).
One particular example of the general application of heuristics is the concept of substitution. This occurs where rather than answer a complex or difficult question, a simpler question or set of questions is addressed, which it is felt captures the essence of the complex question (Gigerenzer & Todd, 1999). This work is consistent with a correct application of the Theories of Reasoned Action and Planned Behaviour, as these simplified rules correspond with sets of beliefs and their consequences (Ajzen, 2011). It should be noted that in some circumstances, heuristics can lead to a failure to properly make accurate judgments (Kahneman, 2011).

The Theory of Planned Behaviour has been challenged as not considering the moral dimension, past behaviour and social identity (Arnold et al., 2006). Several studies have found that moral obligation can add to the prediction of intention and/or behaviour over and above the core TPB variables (Raats et al., 1995). One example empirically testing the moral norm as an additional explanatory variable is a study in relation to decision making in the medical profession (Randall & Gibson, 1991). Another similar example is a Dutch study by Harland et al., (1999) on environmental behaviour. It can be argued that it is unlikely that there is an important moral dimension to behaviour concerning intention to buy a technology tool in a business context. The use of technology is typically not changing the underlying process to which it is applied, and use of technology rarely has a moral or religious dimension.
In relation to past behaviour, repeated behaviour is thought to create a habit which can mean that intention formation is bypassed and behaviour is automatic. However, this is usually typically observed in the case of behaviours that are (or can be) performed regularly and which do not require high levels of skill (Arnold et al., 2006) or are performed regularly in a vocational context (Millar & Shevlin, 2003). This would not appear to be the case for technology buying behaviour in the context of a tax function, which requires a level of skill and is infrequent.

Finally, it has been argued that a sense of identity with a social group can influence behaviour (Norman et al., 2005). In the specific context of tax technology behaviour it is unlikely that heads of tax would identify with a given social grouping so as to influence behaviour (beyond the subjective norm aspect considered above). The main argument for this is that heads of tax act in a professional context and are unlikely to bring influences from outside the professional and work environment into their behaviours. It is the case however that professional groupings such as industry forums for heads of tax may be the mechanism by which a head of tax may first learn of a potential offering.

Venkatesh and Davis (2000) in their TAM2 studies believe that Subjective Norm represents and captures the social influence in a work environment.
They do not incorporate variables or hypotheses attempting to measure identity with wider social groups in the context of technology adoption.

Some aspects of identity with wider social groups that might have a bearing on technology adoption are essentially related to demographics. For example, younger age may have a bearing on comfortableness with use of Internet based communication, and has also been shown to correlate with increased importance of subjective norm on technology adoption (Morris & Venkatesh, 2000). Similarly differences in gender can lead to differences in technology adoption (Gefen & Straub, 1997). Demographic data will be collected as part of this study, and allows identification of differences to a limited degree in relation social groups in relation to age and gender.

The Theory of Reasoned Action and the Theory of Planned Behaviour have been used and validated statistically in a large number of studies as described in meta analyses by Sheppard (1988) on TRA and Armitage (2001) in relation to TPB. There may be room for additional explanatory power coming from further examination of past behaviour, habit and uncertainty avoidance (Ajzen, 2011). Of these three, in the context of this study, uncertainty avoidance appears to be the only salient factor to be aware of when considering a purchase of tax technology, which is not a repeated or regular event for tax directors.
2.2.4 Alternatives to TPB

There are very few alternative models to Theory of Planned Behaviour that have been shown to have equivalent explanatory power, however, one alternative model, the Prototype/Willingness model (Gerrard et al., 2008) (see Figure 4 below) explores an alternative approach to how decisions are formed. Under this model, willingness to engage in a behaviour is not driven by a preconceived intention but is more spontaneous. It is determined by the extent to which the person identifies themselves with a prototypical person who carries out the behaviour in question (Ajzen, 2011). An example of this would be a young person deciding to take up smoking on the basis that they wished to identify themselves with their image of an idealised cool or rebellious young person who smokes.

Figure 4: Prototype Willingness Model (Gerrard et al., 2008)
As can be seen from the above, the prototype/willingness model is associated more with spontaneous and social behavioural decision making than with a business context. Empirical studies, however, appear to show that in general the Theory of Planned Behaviour has greater explanatory power than Prototype/Willingness theory (Fishbein & Ajzen, 2011).

A recent study of behaviour in relation to skin protection confirms this conclusion finding that intention appeared to be a significantly better predictor of behaviour than willingness (Matterne et al., 2011). It may be the case that that reference to prototype could be a useful additional variable in the Theory of Planned Behaviour (Rivis & Sheeran, 2003), however, the initial empirical evidence in support of this has been challenged on the basis that the measure used for prototype as a variable is too close to a measure of self reported or past behaviour (Ajzen, 2011).

In conclusion, the Theory of Planned Behaviour has strong empirical support and is a solid foundation for studies of decision making by individuals. The areas where it has less explanatory power, such as habitual purchases (Ajzen, 1991) are not relevant to the business decision making context of this study, where the purchase of technology of a given type is an infrequent or one off event, and is made in the context of fulfilling a work role.
2.3 Technology Acceptance

Technology acceptance studies seek to identify factors that cause individuals to accept and make use of systems (adopt the technologies) (King & He, 2006; Venkatesh et al., 2003). One of the longest established and most tested models in the field is the Technology Acceptance Model (TAM). The Technology Acceptance Model has been tested in many empirical research projects (Ajzen, 1985; King & He, 2006; Venkatesh & Davis, 2000). Legris et al. (2003, p. 202) state in relation to the Technology Acceptance Model:

“It has been tested in many empirical researches and the tools used with the model have proven to be of quality and to yield statistically reliable results.”

2.3.1 Technology Acceptance Model

The Technology Acceptance Model was derived from the earlier and more generic model of human behaviour described above – the Theory of Reasoned Action (TRA) (Davis, 1986). The technology acceptance model was first postulated by Davis (1986) in his PhD thesis. The thesis covered two empirical studies, one involving responses from 112 employees of IBM’s Toronto development laboratory of email and file editor software, the other involving variants of the TAM model tested with 40 MBA students in relation to two drawing systems in an experimental setting.
The model is shown in outline in Figure 5 below (Davis, 1986):

Figure 5: Initial Technology Acceptance Model (Davis, 1986)

![Diagram of the Initial Technology Acceptance Model](image)

The model postulates that design features of software will strongly influence the formulation of two key beliefs about the system, being Perceived Ease of Use and Perceived Usefulness. These beliefs will in turn influence the formation of an attitude to using the software. Finally, attitude to the software is hypothesised to be a major determinant of its actual use (Davis, 1986).

In the above model, Davis (1986, p. 26), defines Perceived Usefulness as “the degree to which a person believes a particular system would enhance his or
“her job performance”. He defines (again at page 26) Perceived Ease of Use as “the degree to which an individual believes that using a particular system would be free of physical and mental effort”. In the above model, Perceived Ease of Use is theorised as having a significant direct effect on Perceived Usefulness, on the basis that a technology system which is easy to use should have a greater impact on improved job performance or usefulness (Davis, 1986).

The formula in the Theory of Reasoned Action (Fishbein & Ajzen, 1975) for attitude formation is

2. \( A_{act} = \sum_{i=1}^{n} b_i e_i \)

where \( b_i \) is belief that performing behaviour B will have consequence i, and \( e_i \) is the evaluation of consequence i, and \( n \) the number of salient beliefs.

This is transformed and simplified in the initial Technology Acceptance Model (Davis, 1986) to:

\( A_{act} = \text{PEOU}.e_1 + \text{PU}.e_2 \)

Where PEOU is perceived ease of use, PU is perceived usefulness and \( e_1, e_2 \) are the evaluation of PEOU and PU respectively.

In the model, Davis (1986) deliberately excludes both Subjective Norm and Behavioural Intention despite these being key components of the Theory of Reasoned Action. In relation to Subjective Norm, he argues that the typical
scenario will see all users seeing the technology together for the first time. On this basis, he argues that no relevant perceived views of important others to the performance of the behaviour will exist at the time when intentions are being formed. In relation to Behavioural Intention, Davis (1986) argues that significant time will elapse between trials of new technology and formation of intention, and since measurement will take place typically shortly after the trial takes place, attitude will be a better predictor of actual use than intention.

Davis et al. (1989) subsequently give an alternative formulation of TAM which shows Behavioural Intention to Use as a step between forming an attitude to use and actually using a system – see Figure 6 below.

Figure 6: Technology Acceptance Model: (Davis et al., 1989)

The rationale for including Behavioural Intention is not explained in this study, however, strong evidence was presented that Behavioural Intention was significantly correlated with actual usage (Davis et al., 1989). Clearly, this is more consistent with Theory of Reasoned Action, which sees attitudes and
subject norms driving behavioural intention (see Figure 2 above). In addition, this study (Davis et al., 1989) introduces an expectation that Behavioural Intention will be directly influenced by Perceived Usefulness. The empirical evidence supported the direct influence of Perceived Usefulness on Behavioural Intention (Davis et al., 1989).

Venkatesh & Davis (1996) use a revised Technology Acceptance Model in additional empirical research which removes Attitude to Use as a variable. They refer to this as the final Technology Acceptance Model. It is shown below.

*Figure 7: Final Technology Acceptance Model (Venkatesh & Davis, 1996)*

This model is derived from conclusions in the study by Davis et al. (1989) that Attitude as a construct could be dropped from the Technology Acceptance Model without serious impact on the explanatory power of the model in relation to Behavioural Intention. Chuttur (2009, p. 10) argues that Attitude is dropped because:
‘Both perceived usefulness and perceived ease of use were found to have a direct influence on behavioural intention, thus eliminating the need for the attitude construct’.

Careful analysis of the Davis et al. (1989) shows however that the Attitude construct did have a partial mediating effect on Behavioural Intention, but that exclusion of Attitude could lead to a more parsimonious or simple model.

TAM has been tested for a number of different technologies in a number of different countries. See below in Table 4, a summary derived from Venkatesh, Davis, & Morris (2007). Examples include a number of studies involving Internet based applications, which are frequently the basis of tax software applications – see for example Sánchez-Franco and Roldán (2005).

Table 4: Example technology types and countries in TAM studies

<table>
<thead>
<tr>
<th>Technology type / Country</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td>(Karahanna &amp; Straub, 1999)</td>
</tr>
<tr>
<td>Groupware</td>
<td>(Lou et al., 2000)</td>
</tr>
<tr>
<td>Expert Systems</td>
<td>(Keil et al., 1995)</td>
</tr>
<tr>
<td>CASE Tools</td>
<td>(Dishaw &amp; Strong, 1999)</td>
</tr>
<tr>
<td>Calculators</td>
<td>(Mathieson, 1991)</td>
</tr>
<tr>
<td>Spreadsheets</td>
<td>(Mathieson, 1991)</td>
</tr>
<tr>
<td>Digital Libraries</td>
<td>(Hong et al., 2002)</td>
</tr>
</tbody>
</table>
Studies have also shown that TAM is a robust model in relation to application to professionals using technology – see for example Yi et al. (2006) and Davis (1993). TAM has been criticised for its simplicity and lack of explanatory power due to lack of reference to other variables (Bagozzi, 2007; Bagozzi et al., 2003). This simplicity will, however, allow parsimony in the construction of a set of variables for statistical analysis in the research model, and potential extensions for the research model are discussed below. Criticism of its failure to take into account group, cultural and social aspects of decision making has been made (Bagozzi, 2007).

It has also been criticised historically for its failure to examine antecedents of perceived usefulness and ease of use (Venkatesh et al., 2007). Davis (1986) does not consider further the design features referred to in Figure 5 above, which influence perceptions. However, research into the determinants of Perceived Usefulness (Venkatesh & Davis, 2000) and Perceived Ease of Use...
(Venkatesh & Davis, 1996) has addressed this to some degree. Other studies have also considered non design feature antecedents. Karahanna and Straub (1999) look at an antecedent variable ‘Availability of User Training and Support’, and Robinson et al. (2005) identify ‘Personal Innovativeness’ as an antecedent.

In relation to the application of TAM to a decision to buy technology (as opposed to adoption and acceptance by a potential user of technology made available to them free of charge or as an employee) there is limited available research or evidence of TAM being used to help explain intention to purchase or actual buying behaviour. Similarly, there is limited research available in relation to organisational level acceptance of technology.

A TAM study focusing on subjects who were the decision makers choosing to adopt use of business management software in an organisation, and analysing survey responses from 109 organisations, did however find strong statistical support for the basic TAM model as a predictor of actual use (Hernandez et al., 2008).

The Hernandez et al. study (2008) shows the potential link to buying decisions since it explores the role of a single decision maker in multiple organisations as opposed to studies of individual users within one organisation. That study examined the intention to use software, however, not the decision to buy, so it is not directly examining the intention to purchase software. This study will directly examine purchase intention.
Indeed the Hernandez et al. paper does not make it clear what in fact the decision maker decided upon. It is not clear that all of the decision makers in the Hernandez study were making similar types of decisions. Any actual differences could compromise the validity of the results. Equally, it is possible that some of the respondents in the study did both make the decision to use the technology then go on to buy it. Arguably, in such circumstances a decision to buy was an essential antecedent of an intention to use the technology in the organisation.

A study by Autry et al. (2010) confirms the view that there is limited research and literature on organisational level acceptance of technology. Their study (which examines acceptance of supply chain technology) operationalises the intention to use variable as “the intention of the organisation to use a specific technology” (Autry et al., 2010, p. 524). Respondents in the study were individual managers for each organisation who were either responsible for managing the supply chain technology function for their firm, or were regular users of supply chain technology. In fact the role of respondents varied widely by job description, from Owner / Proprietor through to Office Administrator or Technology Analyst.

The Autry study developed measures that are written so as to ask the individual respondent to reply ‘on behalf of’ the organisation. For example Intention to Use measures use ‘We intend to’ and ‘Our people will want to’ within the questions developed (Autry et al., 2010, p. 533). The study does not
use Structural Equation Modelling in testing Technology Acceptance Model hypotheses, but does use regression techniques. The regression analysis showed strong support for the relationship between perceived ease of use and perceived usefulness, and perceived usefulness and intention to use the technology, but did not support the relationship between perceived ease of use and intention to use the technology.

The Autry study could be challenged on the use of a single individual within each organisation as someone who can represent the views of the organisation as a whole, both because they are asked to express organisational rather than personal views which may not in reality truly represent the views of other key decision makers, and because of the wide range of roles and job titles of respondents – which indicates respondents may either be regular users or key organisational decision makers.

Autry et al. (2010, p. 533) recognise that a shortcoming of their research includes limitations in the method of statistical analysis, and risk of response bias. They also recognise that other organisational factors such as cost or brand reputation may impact on organisational acceptance, but do not explore this in their research model (Autry et al., 2010, p. 523).

2.3.2 **Augmented Technology Acceptance Model**

The Theory of Planned Behaviour (TPB) which extended the TRA became the basis for extension of the original Technology Acceptance Model to include Perceived Behavioural control. An extension of TAM to include both
Perceived Behavioural Control and Subjective Norm has been put forward in the form of the Augmented TAM model (Taylor & Todd, 1995a). It is shown in diagram form in Figure 8 below.

It has been found that Subjective Norm can strongly influence business decisions in relation to adoption of technology by businesses (Karahanna & Straub, 1999; Venkatesh & Davis, 2000; Yu & Tao, 2007). In addition, inclusion of Perceived Behavioural Control overcomes a core problem with the Theory of Reasoned Action and brings the Technology Acceptance Model into line with the Theory of Planned Behaviour (Taylor & Todd, 1995a; Taylor & Todd, 1995b).

Figure 8: Augmented TAM (Taylor & Todd, 1995a)

The Taylor and Todd studies (1995a; 1995b) show that perceived behavioural control and subjective norm added explanatory power to the basic Technology
Acceptance Model. For subjective norm, this was consistent with previous organisational studies (Barki & Hartwick, 1994; Moore & Benbasat, 1991). In relation to Perceived Behavioural Control studies have similarly supported its added explanatory power (Barki & Hartwick, 1994; Mathieson, 1991).

The Taylor and Todd studies also found that Perceived Usefulness had a direct effect on behavioural intention. A study of IT acceptance in hotels found that Augmented TAM (described in the study as Decomposed Theory of Planned Behaviour DTPB) might better explain behavioural intention but finds TAM superior as a parsimonious predictor of intention to use (Huh et al., 2008).

In this study, the focus is on whether technology acceptance can help predict behavioural intention (in this case to buy) in a business to business buying context. For this reason, access to resources necessary to buy and use the technology (Perceived Behavioural Control) and the views of others who might influence the buying decision (Subjective Norm) are expected to impact on the intention to buy of the lead buyer. For this reason, it is proposed to adopt the Augmented Technology Acceptance Model.

2.3.3 Later Development of the Technology Acceptance Model

Two later versions of the Technology Acceptance Model, known as TAM2 and TAM3 are described below. In both cases the final Technology Acceptance Model (Venkatesh & Davis, 1996) is extended. Firstly the extensions are in relation to antecedents of Perceived Ease of Use and
Perceived Usefulness. Secondly the extension is via the introduction of Subjective Norm as an antecedent of Behavioural Intention.

TAM2 (Venkatesh & Davis, 2000) firstly explores a number of additional variables that act as antecedents to Perceived Usefulness, to help develop a model which seeks to explain why the system was perceived to be useful. It also then considers the impact of Social Influences (predominantly Subjective Norm) on Behavioural Intention. The model is reproduced below.

Figure 9: TAM2 (Venkatesh & Davis, 2000)

The antecedents of Perceived Usefulness described in the model appeared to explain up to 60% of variance in Perceived Usefulness in this study and therefore extend the explanatory power of the original TAM model. The study also found that Subjective Norm exerted a direct effect on Intention to Use in the situations where use of the system was mandatory, but not where use of
the system was voluntary. It should be noted that the empirical research by Venkatesh and Davis (2000) supporting TAM2 had small sample sizes in each of four studies (N=50). In addition analysis was based on Linear Regression not Structural Equation Modelling.

TAM3 (Venkatesh & Bala, 2008) extends TAM2 through the introduction of a number of additional variables that act as antecedents to Perceived Ease of Use. The model is reproduced below.

Figure 10: TAM3 (Venkatesh & Bala, 2008)
The study found that using Partial Least Squares analysis, the antecedents to Perceived Ease of Use did appear to act as significant predictors of Perceived of Use as anticipated. It generally supported findings made in the TAM2 study.

2.3.4 Alternative to Technology Acceptance Models - UTUAT

Venkatesh et al. (2003) carried out a meta-analysis of user acceptance models prominent in the literature, ultimately deriving a synthesised model derived from elements of all of them – the Unified Theory of Acceptance and Use of Technology (UTAUT). The UTAUT has a significant number of variables however, and is very complex. It has been criticised for this and in general terms by Bagozzi (2007, p. 252) who describes it as: “a patchwork of many largely unintegrated and uncoordinated abridgements.” It should be noted that Bagozzi (2007) is critical of TAM’s simplicity but recognises its strong empirical pedigree and superiority over many other models.

It is worth noting that McLeod et al. (McLeod & Pippin, 2012; McLeod et al., 2009b; McLeod et al., 2009a) used UTAUT in the context of assessing user acceptance of tax preparation software. Their study (McLeod & Pippin, 2012) looked at personal tax software used both by individuals and professionals in an individual acceptance of the software (not a buying context). They used partial least squares to examine intention to use the software for the two groups, professionals and non professionals, and found significant differences between the two groups.
Notwithstanding this, the lack of reference to Attitude to Use in UTAUT, together with its above criticisms, eliminates it as a potential choice for the overall model developed in this study in a buying context. As will be outlined in detail below, Attitude to Use can be construed as a proxy for Perceived Quality of the technology, allowing connection to wider buying models and allowing a more comprehensive single model of intention to buy to be developed. The UTUAT model is shown in Figure 11 below.

Figure 11: UTAUT (Venkatesh et al., 2003)

2.3.5 Conclusions in relation to Technology Acceptance Models

In relation to the focus of this research, it is felt that the Augmented Technology Acceptance Model is the appropriate base model technology.
acceptance model for this study. The final TAM model outlined above does
not preclude the inclusion of Attitude to Use as a variable and shows it has a
partial mediating effect on Intention to Use technology. It also fails to take into
account Subjective Norm and Perceived Behavioural Control, which in the
context of this study are felt important as outlined above.

TAM2 introduces Subjective Norm as a variable bringing the Technology
Acceptance Model closer to Augment TAM. The antecedents of Perceived
Ease of Use and Perceived Usefulness in TAM2 and TAM3 are not directly
relevant to the research objectives of this study. given its broad acceptance in
technology acceptance and its basis in the widely used and validated Theory of
Planned Behaviour. Both TAM2 and TAM3 do not take into account
Perceived Behavioural Control, which is important in an organisational and
buying context.

It is clearly the case that in the context of a buying decision, factors other than
attitude towards technology or intention to use it are likely to be present
(Autry et al., 2010). A key example is price. In a business to business context,
to some degree a buying decision will be influenced by price although this
may not be the most important criteria (Abratt, 1986). This will be a factor the
decision making individual will need to be able to explain and validate to
others as an agent of the business showing the trade-off between price and
value received from the supplier (Ford et al., 2006). The closer in nature two
potential offerings are excluding price then the greater the chance that a price
differential will be seen as unfair and that the cheaper offering will be chosen
(Xia et al., 2004).

Buying models drawn from both Consumer and Organisational buying theory
are examined below to consider additional variables that should be potentially
considered in Modelling Intention to Buy, such as perception of relative price
of competing or similar products.

2.4 Consumer Buying Models

One classic model of buyer behaviour according to Oliver (1995) is the
Howard and Sheth model (Howard & Sheth, 1969). This model brings
together theoretical positions from several behavioural sciences, and attempts
to integrate attitude, intention and purchase with a number of stimulus factors,
such as quality, distinctiveness, service and price (Lunn, 2011). It is illustrated
in Figure 12 below.

In the model, input variables are the stimuli that the consumer receives.
Significative stimuli are actual characteristics of products and brands that the
buyer confronts. Symbolic stimuli emerge through advertising and act on the
consumer indirectly. Social stimuli include the influence of family and others.
The influence of such stimuli is internalised by the consumer before they
affect the decision process, causing the formation of attitudes and intentions leading to purchase behaviour (Loudon & Della Bitta, 1993).

Figure 12: The Theory of Buyer Behaviour (Howard & Sheth, 1969)

The model clearly reflects key aspects of the Theory of Reasoned Action, Theory of Planned Behaviour and Technology Acceptance Models. All of these models have the same core foundational characteristics shown in Figure 13 below. This means the Theory of Buyer Behaviour (Howard & Sheth, 1969) is consistent with the theory behind the Augmented Technology
Acceptance Model in key respects. It also highlights factors such as price, service and quality as dimensions that can affect purchase behaviour.

The Howard and Sheth model has been criticised on the basis that it is founded on a rational decision sequence which assumed too rational a consumer (McKechnie, 1993). A criticism of the Theory of Buyer Behaviour and similar models such as the Consumer Decision Model (Engel et al., 1968) is that many of the variables within the models are unobservable and do not lend themselves to empirical investigation (Loudon & Della Bitta, 1993). For this reason, it remains questionable whether they have any predictive value (Erasmus et al., 2001).
The Theory of Buyer Behaviour and the Consumer Decision Model are two of the most widely cited analytical consumer buying models. As stated above, analytical models have been challenged due to lack of predictive power. The Theory of Reasoned Action and the Theory of Planned Behaviour, together with the Augmented Technology Acceptance Model, are prescriptive in that they “provide guidelines or frameworks to organise how consumer behaviour is structured” (Moital, 2006, p. 44). Prescriptive models include causal paths and expected behavioural responses. They allow studies of what stimuli should be modified or emphasised to attract a certain consumer response (Bray, 2008). The Theory of Reasoned Action and the Theory of Planned Behaviour are themselves consumer buying models (Bray, 2008).

It is clear from the above that the Theory of Planned Behaviour, or a specific derivation of it for technology (such as the Augmented Technology Acceptance Model), is a suitable base model for examining buying behaviour. It is also important that when using such theories, all key attributes that might impact on attitudes formed by the consumer are identified when seeking to model consumer buying behaviour (Solomon, 2010). One useful mechanism for considering key attributes is to look at models considering the antecedents of value for money, which is a key driver of consumer behaviour (Zeithaml, 1988). A number of conceptual models of value for money have been proposed (Monroe, 1990; Thaler, 1985; Zeithaml, 1988). Of these, Zeithaml (1988) is a frequently cited reference for exploration of perceived value.
The Zeithaml model principally examines the relationships between the concepts of price, perceived quality, and perceived value, as illustrated in Figure 14.

Zeithaml (1988, p. 14) defines perceived value in the model as:

"the consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given."

The Zeithaml model was not an empirical study of a construct of perceived value, rather a review of previous literature and studies. The major models of value tend to link value to purchase intention and empirically examine that...
relationship (Patterson & Spreng, 1997). A frequently cited model for value for money which examines the link to purchase intention (described as willingness to buy) was developed by Sweeney et al. (1999). This model reflects the work of Zeithaml (1988) and develops an empirical conceptualization of it. It is illustrated in Figure 15 below.

Figure 15: Perceived Value For Money (Sweeney et al., 1999)

In the analysis by Sweeney et al. (1999) clearly both Perceived Risk and Perceived Service Quality can impact on the perception of Value For Money. Perceived Risk can have two dimensions – one financial (the risk of future
financial loss or cost through product failure) and one performance related
(failure to perform as expected) (Sweeney et al., 1999). Perceived Service
Quality can have both technical and functional dimensions, technical being
related to knowledge and operation of the product, and functional relating to
the general responsiveness and support shown in relation to ongoing
interactions in relation to the product (Sweeney et al., 1999).

In the above model, it could be argued that Attitude to Use as a construct is
similar to the concept of Perceived Product Quality. In fact, it has been
specifically identified that perceived product quality is equivalent to attitude to
the product (Zeithaml, 1988). Olshavsky (1985) sees perceived quality as a
form of overall evaluation of a product, and views perceived quality as similar
to attitude. This view is supported by Holbrook and Corfman (1985). This
lends support to the use of Attitude to Use of a technology as a proxy for
Perceived Product Quality in an empirical examination of Intention to Buy
technology.

Finally, as highlighted above, price is a key factor in buying decisions.
Perceived Relative Price in the model identifies whether the price of the
product is high relative to an alternative product with similar features
(Sweeney et al., 1999). In this regard, perception of price is a more
fundamental driver of perception of value than objective measures of price
(Zeithaml, 1988). This is directly relevant to this study as price is a key factor
in relation to purchase intention (Patterson & Spreng, 1997).
2.5 Organisational and Business Buying Models

Classical models of industrial buying behaviour examine buying processes carried out by individuals, interacting with other individuals in a formal organisational setting (Webster & Wind, 1972). Three seminal models of organizational buying behaviour are discussed below. They are the Buygrid Framework (Robinson et al., 1967), the Sheth Model of Organisational Buying (Sheth, 1973), and the General Model of Organisational Buying Behaviour (Webster & Wind, 1972).

However, it has been pointed out that there is no widely accepted and respected theory of organisational buying behaviour, and no theoretical foundation against which more sophisticated analytical studies can be carried out (Sheth, 2006). In relation to organisational business buying (OBB) Sheth (2006, p. 111) says “the OBB area waits for a good theory and more modelling type scholars”.

It has also been pointed out that for a large number of organisational buying scenarios, there is little real distinction between organisational and consumer buying, particularly where the influence of others on individual decision making is taken into account (Wilson, 2000). The argument against treating consumer and organisational marketing differently is advocated by Fern and Brown (1984).
Similarities between consumer and organisational marketing highlighted by Fern and Brown include the fact that individuals make consumer buying decisions in a group context in a family context, and in industrial buying scenarios for some less important purchases individuals autonomously carry out the buying activity similar to individual consumers. This is supported by Zaltman and Wallendorf (1979). The applicability of consumer buying models to organisational settings and vice versa was also recognised by Wind (1978).

Finally, the importance of relationships between organisations has been stressed even in the context of a one-off purchase, as strong relationships can reduce obstacles in evaluating a purchase such as perceived risks or ambiguity as to the service quality associated with a purchase (Hakansson, 1982).

2.5.1 Classical Organisational Buying Models – the Buygrid framework

The Buygrid framework (Robinson et al., 1967) is an analytical framework which describes the process that buyers go through as they make a purchase decision in an organisational context. The study identified the existence of multiple buying participants, identified an 8 stage buying process, and advocated a series of buying situations for which the buying process is different. The framework consists of a matrix of Buyclasses and Buyphases. The Buyclasses (types of purchase or buying situation) are columns in the matrix:
**New Tasks:** The first-time buyer seeks a wide variety of information to explore alternative purchasing options. The more expensive or the greater the perceived risks related to the purchase, the greater the requirement for information and the larger the number of individuals participating in the buying decision.

**Modified Rebuy:** The buyer wants to replace an existing product. The decision making typically involves changes to product specifications, prices, terms or suppliers because it is believed that such a change will enhance quality or reduce cost. In such circumstances, there are fewer participants in the buying process and a quicker decision making process arises than in a new task buyclass.

**Straight Rebuy:** The buyer routinely reorders an existing product. The buyer retains the supplier as long as satisfaction with the delivery, quality and price is maintained.

Buyphases are distinct stages in the purchasing process and rows in the matrix. Eight distinct but related phases are identified:

1. Recognition of the organizational problem or need
2. Determination of the characteristics of the item and the quantity needed
3. Description of the characteristics of the item and the quantity needed
4. Search for and qualification of potential sources
5. Acquisition and analysis of proposals
6. Evaluation of the proposals and selection of suppliers

7. Selection of an order routine

8. Performance feedback and evaluation

The above model focuses on different types of purchase and the impact of those differences on the buying process. The study did not utilise empirical data to establish the validity of Buyclasses as a variable. A study by Bellizi and McVey (1983) found that Buyclass variables were non-significant as predictors of buying influence of different participants in the buying process. An alternative formulation of purchase types was presented by Bunn (1993).

Bunn (1993) is well cited and provides an empirically established classification scheme (Sheth, 1996). It provides a scheme similar to that of Robinson et al. (1967) but derives, for example, two buying scenarios for each of New Task and Modified Rebuy (Judgmental New Task & Strategic New Task, and Simple Modified Rebuy and Complex Modified Rebuy). In the Bunn schema, the buying approach is determined by a combination of situational characteristics: the purchase importance, task uncertainty, extensiveness of choice of purchase options and perceived buyer power. Task uncertainty according to Bunn (1993, p. 45) “subsumes the notions of novelty and complexity”. It represents the lack of available information and experience in relation to the purchase (Bunn, 1993).
Table 5: Descriptions of Buying Decision Approaches (Bunn, 1993)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Casual</th>
<th>Routine</th>
<th>Simple</th>
<th>Judgmental</th>
<th>Complex</th>
<th>Strategic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>low</td>
<td>Modified</td>
<td>New Task</td>
<td>Modified</td>
<td>New Task</td>
<td></td>
</tr>
<tr>
<td></td>
<td>priority</td>
<td>Rebuy</td>
<td></td>
<td>Rebuy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Situational Characteristics</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase importance</td>
<td>Minor importance</td>
<td>Somewhat important</td>
<td>Quite important</td>
<td>Quite important</td>
<td>Extremely important</td>
</tr>
<tr>
<td>Task uncertainty</td>
<td>Little uncertainty</td>
<td>Moderately uncertain</td>
<td>Little uncertainty</td>
<td>Great amount uncertainty</td>
<td>Little uncertainty</td>
</tr>
<tr>
<td>Extensiveness of choice set</td>
<td>Much choice</td>
<td>Much choice</td>
<td>Narrow set of choices</td>
<td>Narrow set of choices</td>
<td>Much choice</td>
</tr>
<tr>
<td>Buyer power</td>
<td>Little or no power</td>
<td>Moderate power</td>
<td>Moderate power</td>
<td>Strong power position</td>
<td>Strong power position</td>
</tr>
</tbody>
</table>

| Buying Activities | | | | |
| Search for information  | No search made | Little effort at searching | Moderate amount of search | High level of search | High level of search |
| Use of analysis techniques | No analysis performed | Moderate level of analysis | Moderate level of analysis | Great deal of analysis | Great deal of analysis |
| Proactive focus         | No attention to proactive issues | Superficial proactive focus | High level of proactive focus | Moderate proactive focus | High level of proactive focus | Proactive issues dominate |
| Procedural control      | Simply transmit the order | Follow standard procedures | Follow standard procedures | Little reliance on established procedures | Follow standard procedures | Little reliance on established procedures |
In the above model, the judgmental new task scenario is highlighted. This describes a typical tax technology buying scenario well. Tax technology in the main is not very extensive from an organisational perspective, relative for example to finance function technology acquisitions generally. However, it can be a large purchase relative to the tax discretionary spend budget. Whilst a poor decision could have an impact on the tax function, typically technology is not critical to the functioning of the function – in case of failure, manual and other methods (such as reversion to spreadsheets and email) – is a backstop. For this reason, tax technology is quite important but not extremely important as a purchase decision.

Typically, tax technology deals with tax specific functionality and its usefulness is as part of a broader tax related process, such that there is initial uncertainty as to exactly what solution will meet requirements. This leads to uncertainty, and typically only a narrow range of products are suitable for the needs of the function. Additionally, suppliers are typically few in number for each class or type of tax technology, which leads to moderate buying power only as the buyer has limited choices. All of these aspects suggest the judgmental new task scenario within the above framework.

### 2.5.2 Classical Organisational Buying Models – the Sheth Model

In terms of format and classification of variables, the Sheth model shown in Figure 16 below, is similar to the Howard and Sheth model of buyer behaviour
described above but there are key differences. Firstly, the Howard & Sheth model looks only at an individual decision making process, whereas the Sheth model explicitly describes joint decision making processes (Sheth, 1973). Secondly, whilst the Howard and Sheth model is arguably a more general model, the Sheth model is limited to organizational buying alone. Finally, there are fewer variables in the Sheth model than in the Howard and Sheth model (Sheth, 1973).

Similarities include the elements of search for information, the influence of the background of individuals on their decision making, perceptual bias, previous purchase satisfaction and product factors.

Figure 16: The Sheth Model of Organisational Buying (Sheth, 1973)
Of specific interest, is the distinction between autonomous and joint decisions. As Sheth (1973, p. 54) says:

“Not all industrial buying decisions are made jointly by the various individuals involved in the purchasing process. Sometimes the buying decisions are delegated to one party, ...”

This is the autonomous decision scenario in the model. In the context of tax technology, the majority of tax technology decisions will be the responsibility of the head of tax as previously stated.

Sheth states that whether or not decision making is done by a group or is autonomous is dependent on both organisational characteristics and product characteristics (Sheth, 1973). In relation to product characteristics, he argues that the more risk is perceived in relation to the product purchase, the more likely a joint rather than autonomous decision is. Other product factors are time (the more time pressured the more likely an autonomous decision) and type of purchase (repetitive purchases are likely to be autonomous).

In relation to organisational characteristics, Sheth (1973) states that organisation size, degree of centralization and company orientation will all be factors. In relation to company orientation, he refers to an example of a production orientated company where decisions may be made autonomously by production personnel. Larger organisations are anticipated to be more likely to have joint decision making. Finally, centralized organisations are more
likely to have autonomous decision making than decentralized ones.

Typically, tax functions are centralized departments, and the technology choice is heavily orientated to tax functional contexts. This is consistent with an autonomous head of tax purchasing decision.

The Sheth model was historically criticised as being too similar to the Howard and Sheth Model (Sheth, 2006). The Howard and Sheth model is typically seen as a consumer buying model, whereas the Sheth model is an organisational or business buying model. The boundary between the two is, however, thin. It has been argued that there is in many cases little distinction between consumer and business buying (Fern & Brown, 1984; Wilson, 2000).

The distinction between consumer and business marketing has been similarly argued as being thin as a consequence of the way global economies have moved over the decades due to technology and the Internet (Wind, 2006). Wind (2006) observes that both B2B and B2C markets are served simultaneously through Internet sales channels. Similarly individuals in organisations can to some degree act like individual consumers in accessing goods and services from a limited range of suppliers on a self service basis, as Internet and procurement technology has evolved.

In the case of individual consumer purchases, whilst it is a single decision maker considering and making a purchase, that decision maker is influenced
by the views or perceived views of others (Wilson, 2000). Conversely, in a business buying context for many situations there is a primary buyer or buying agent acting autonomously but influenced by the views of others in the organisation (Spekman & Stern, 1979).

### 2.5.3 Classical Organisational Buying Models – Webster and Wind

#### General Model

The Webster and Wind model of organisational buying behaviour is a general model which together with the Sheth model considers more factors than the Buygrid model. It considers four sets of variables which affect the buying decision making process in an organisation. These are environmental, organizational, buying center, and individual variables. The term buying center represents the group of people making the purchasing decision – also sometimes called the decision making unit or DMU (Webster & Wind, 1972). A major part of the model is to introduce the need to examine group dynamics within the buying centre (Sheth, 2006).

As stated above, this model introduced the concept of the buying centre. The buying center includes five roles: Users, Buyers, Influencers, Deciders and Gatekeepers (Webster & Wind, 1972). Users are representatives of those within the organisation who will use the purchased products and services. Buyers are those within the organisation with formal responsibility for
contracting with suppliers and (in most cases) who ultimately makes a decision to purchase from a supplier. Influencers are those who influence the decision process directly or indirectly. Deciders are those individuals who participate in the buying decision process. Gatekeepers are individuals who control the flow of information to others in the buying center. Webster and Wind (1972) note that several individuals may occupy the same role or one individual may occupy more than one role.

A meta study and analysis of empirical data has shown that the key factors driving the size and influence of the buying centre are buyclass and purchase importance (Lewin & Donthu, 2005). In this regard, it has been noted that there is a degree of overlap between buyclass and product type. For example, it has been argued that minor capital equipment purchases (even if first time purchases) are analogous to the Modified Rebuy buyclass (Bellizzi & McVey, 1983). Low purchase importance appears to correlate with a small buying centre or limited buying centre influence (Lewin & Donthu, 2005).

The model still sees individuals at the heart of decision making, but it is asserted that decision making by individuals is heavily constrained by organisational and interpersonal factors. As Webster and Wind state at (1972, p. 18):
'In other words, the buyer (or purchasing agent) is in most cases the final decision maker and the target of influence attempts by other members of the buying center.'

In the case of this study, the head of tax is typically acting in the role of buyer as an agent of the finance function within the organisation. Procurement are not involved for the majority of tax technology purchase decisions, and only rarely is the process formalized with a non tax function purchasing agent. The head of tax is, however, answerable to parties in the finance function such as the finance director, and must make decisions that are at least rationally explainable to procurement functions when they are involved in order to avoid conflict and challenge. The head of tax will also be influenced by the views of others in finance, IT and the tax function as to the appropriate choice of tax technology (or indeed whether any of the available technologies is suitable for adoption and use in relation to tax processes).

This combination of individual decision making, together with perceived organisational constraints (perceived behavioural control) and being subject to the influence of others (subjective norm) has a direct read across to the Theory of Planned Behaviour (Ajzen & Madden, 1986). The model is shown in Figure 17 below.
The model also introduces the distinction between task and non task activities carried out within the buying centre. Webster and Wind (1972, p. 13) describe task variables as relating directly to the buying problem, and non task
variables as extending beyond the buying problem. It is recognised that there can be substantial overlap between the two. A useful example of task and non task variables operating at different levels is provided by Webster and Wind (1972, p. 13) and is summarised in Table 6 below.

Table 6: Examples of task/non task variables

<table>
<thead>
<tr>
<th></th>
<th>Task</th>
<th>Non Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td>Desire to obtain lowest price</td>
<td>Personal values and needs</td>
</tr>
<tr>
<td>Social</td>
<td>Meetings to set specifications</td>
<td>Informal, off the job interactions</td>
</tr>
<tr>
<td>Organisational</td>
<td>Policy regarding local supplier preference</td>
<td>Methods of personnel evaluation</td>
</tr>
<tr>
<td>Environmental</td>
<td>Anticipated changes in prices</td>
<td>Political climate in election year</td>
</tr>
</tbody>
</table>

The inclusion of non task variables illustrates how decision making at the level of an individual may not always be objective and solely at the level of an individual purchase. Clearly, for example, the views of others and social influences must be taken into account in any explanatory model of the buying decision.
2.6 Business Relationships

The importance of relationships to marketing and buying processes, particularly in relation to business to business transactions and service industries, is now firmly established (Constantinides, 2006; Ford et al., 2006; Hakansson et al., 2009; Palmatier, 2008). It is clear that understanding the business relationship context is essential in looking at a buying decision. Ford et al. (2006) go so far as to say that it is impossible to make sense of a single business purchase outside the context of the relationship between buyer and seller organisations. Similar views are expressed in other marketing texts looking at business to business buying (Brennan et al., 2010; Hutt, 1997).

Relationship quality as a concept was introduced in a seminal article by Crosby et al. (1990). In this conceptualization, high relationship quality represents the buyer’s belief in the integrity of the seller, and confidence in the future performance of the seller due to positive past experiences (Crosby et al., 1990). It has been argued that a global construct of relationship quality, as reflected by a combination of commitment, trust, and relationship satisfaction, offers the best measure of relationship strength and provides the most insight into the impact on seller performance and buying decisions (De Wulf et al., 2001; Palmatier et al., 2006; Rust et al., 1995).
Palmatier et al. (2006) conducted a meta study of mediators in relationship management which seeks to look at constructs which capture and measure the strength of relationships and the impact on buyer seller interactions. The mediators are summarised in Table 7 below.

Palmatier et al. (2006) found that Relationship Quality as a construct (a composite measure of relationship strength) had the greatest influence on objective performance from a seller perspective. This indicates that relationship quality as a single composite construct might have more explanatory power than other individual mediators. Indeed many commentators have said it is preferable to model the three mediators of trust,
commitment and satisfaction as a single higher order construct, ‘Relationship Quality’ (Crosby et al., 1990; De Cannière et al., 2007; De Wulf et al., 2001; Rust et al., 1995).

2.6.1 Operationalising Relationship Quality as a driver of behavioural intention

De Cannière et al. (2007) conducted a study in a retail context to compare the Relationship Quality and the Theory of Planned Behaviour models as predictors of behavioural intention to purchase consumer goods. De Cannière et al. draw on the Relationship Quality model (Anderson & Mittal, 2000). This is a consumer based model asserting that high levels of relationship quality will drive continued buying intention. It operates on the premise that a consumer’s positive past experience of interactions with the seller creates high relationship quality and drives buying intention.

The De Cannière et al. (2007) study showed that Relationship Quality as a single construct provided better explanatory power in relation to intention than individual constructs for trust, commitment and satisfaction. It also showed that the individual components of trust, commitment and satisfaction were highly correlated consistent with the findings in other major studies such as Garbarino & Johnson (1999).
Though the De Cannière et al. study was in a B2C context, there are many similarities between business to business marketing and business to consumer marketing. Both consumer and business purchasers are affected by their previous experiences and interactions with a supplier. They both consider possible future purchases. Both need reassurance with regard to aspects of the purchase that cannot be directly assessed by themselves, and therefore seek advice from third parties (such as specialists and friends) (Gummesson, 1994).

In this regard, constructs for relationship quality should be capable of being operationalised across both business and consumer buying scenarios, and in particular each of the trust, commitment, satisfaction and relationship quality variables feature as mediators and constructs in both business to business and business to consumer studies (Morgan & Hunt, 1994; Palmatier et al., 2006).

2.6.2 Examining Trust, Commitment and Satisfaction as components of Relationship Quality

In relation to trust, commitment and satisfaction, commitment has been defined as "an enduring desire to maintain a valued relationship" (Moorman et al., 1992, p. 316). Trust has been defined as "confidence in an exchange partner's reliability and integrity" (Morgan & Hunt, 1994, p. 23). The third relationship mediator, relationship satisfaction, has been described as “a
customer's affective or emotional state toward a relationship” (Palmatier et al., 2006, p. 139).

In the De Cannière et al. (2007) study measures of each of trust, satisfaction and commitment derived from the literature and adapted for the purposes of that study – being the items measuring the Relationship Quality construct are set out. They are summarised in Table 8 below. The De Cannière et al. Relationship Quality construct will be compared with the equivalent construct for business buying to demonstrate that there is strong consistency between them. From this, the suitability of joining a business to business construct to a consumer buying model can be supported.

Table 8: Relationship Quality Constructs (De Cannière et al., 2007)

| 1. I have confidence in the retailer (trust) |
| 2. The retailer gives me a feeling of confidence (trust) |
| 3. I have the feeling that the retailer is trustworthy (trust) |
| 4. I am willing to go the extra mile to buy apparel at the retailer (commitment) |
| 5. I have a clear commitment towards the retailer (commitment) |
| 6. I would recommend the retailer to a family member, friend or acquaintance (commitment) |
| 7. I certainly like the retailer (satisfaction) |
| 8. I am very satisfied with the retailer (satisfaction) |
| 9. I have a favourable opinion about the retailer (satisfaction) |

2.6.3 Examining Relationship Quality and its components at an individual and an organisational level
Relationship marketing and relationship quality research is a huge body of knowledge with many complex dimensions. One dimension of analysis is the individual vs. organisational level at which constructs operate. By their very nature, organisations operate at both individual, teams and organisational levels. They interact with themselves and with other individuals both inside and outside their organisation. It is critical to consider level issues in theory development, data collection and analysis. Every construct is tied to or appropriate to one or more organisational level (Klein et al., 1994).

For example, trust has been introduced as an inter-personal construct (e.g. Morgan and Hunt (1994)), whereas trust has also been considered as operating across individual and organisational levels (e.g. Doney and Cannon (1997)). Mouzas et al., (2007) argue that it may be possible for individuals to have trust in an organisation, but challenge whether there is a meaningful context of trust by an organisation (since only individuals have that capacity to trust).

Chow and Holden (1997) consider two types of trust in purchasing environments: trust in a salesperson and trust in the selling company. Therefore they distinguish between different levels of operation of this construct. However, on review of their measures, those used for a selling company context are easily amended for individual context and vice versa.
An example is “This company can’t be trusted, it's just too busy looking out for itself” which can easily have a salesperson analogy “This person can’t be trusted; he is just too busy looking out for himself”.

2.6.4 Relationship Quality Constructs at a B2B level

In the context of this study, individual buyers (heads of tax) are considering buying from organisations. Relationship quality is examined from the perspective of an individual buyer on the quality of the relationship between the buying and the selling company. In this study, relationship quality and its antecedents are not the main focus of the study. However, given the potential importance of the relationship between organisations to an individual episode of buying, a relationship construct or constructs are required.

Palmatier (2008) developed a composite set of measures for relationship quality in a business to business context, covering dimensions of trust, commitment, reciprocity and exchange efficiency. The trust and commitment related measures have clear parallels with the measures described in Table 8 above in a retail and consumer context. The individual measures used by Palmatier are derived from measures developed and tested in previous studies (Palmatier, 2008, p. 81).

The closeness to a consumer construct of Relationship Quality, together with the business to business context of the measures, makes the measures
suitable for the purposes of this model. This model takes a consumer buying framework but integrates in a business to business buying context and seeks to introduce into that context Relationship Quality as a latent variable. The measures reported and used in the model in this study are described in Table 9 below:

Table 9: Measures of Relationship Quality (Palmatier, 2008)

<table>
<thead>
<tr>
<th>Commitment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• We are willing “to go the extra mile” to work with this rep.</td>
<td>• We view the relationship with this rep as a long-term partnership.</td>
</tr>
<tr>
<td>• We have trust in this rep.</td>
<td>• This rep is trustworthy.</td>
</tr>
<tr>
<td>Reciprocity norms</td>
<td></td>
</tr>
<tr>
<td>• There is a norm of reciprocity guiding our relationship with this rep.</td>
<td>• We would help each other without expecting an immediate favour in return.</td>
</tr>
<tr>
<td>Exchange efficiency</td>
<td></td>
</tr>
<tr>
<td>• Our dealings with this rep are very efficient.</td>
<td></td>
</tr>
</tbody>
</table>

2.7 Conclusion

The literature review shows the linkage from behavioural psychology and decision making, to technology acceptance theory and models. It shows how this extends quite naturally to consumer buying models drawing heavily on the common base of the Theory of Planned Behaviour that exists behind both. The Augmented Technology Acceptance Model (Taylor & Todd, 1995a) is identified as a strong model to capture theoretical constructs for the decision to adopt and use information technology.
The extension from Technology Acceptance to a buying framework is then considered. The technology acceptance model is used to explain attitude to use of technology. In the literature review, it has been specifically identified that perceived product quality is equivalent to attitude to the product (Zeithaml, 1988). Product quality is a construct in wider consumer buying models, and a useful and typical model for consumer buying was identified in the review (Sweeney et al., 1999).

The focus of this study is however organisational buying rather than consumer buying. The literature review therefore examined the similarities and differences between consumer buying models and organisational buying models. It noted that for a large number of organisational buying scenarios, there is little real distinction between organisational and consumer buying, particularly where the influence of others on individual decision making is taken into account (Fern & Brown, 1984; Wilson, 2000).

The case for the scenario in this study being equivalent to one of these organisational buying scenarios is made, for example, by reference to a Judgmental New Task buying decision approach (Bunn, 1993) and autonomous decision making (Sheth, 1973). It is also identified that there is no widely accepted and respected theory of organisational buying behaviour, and no theoretical foundation against which more sophisticated analytical studies can be carried out (Sheth, 2006). On this basis, a consumer buying model such
as the Sweeney model (Sweeney et al., 1999), adapted for organisational buying context appears a reasonable potential methodological approach to examining buying decisions.

Finally, the importance of inter organisational relationships as a key factor in buying decisions in a business to business context was examined. Ford et al (2006) go so far as to say it is impossible to make sense of a single business purchase outside the context of the relationship between buyer and seller organisations. It was identified that a global construct of relationship quality, as reflected by a combination of commitment, trust, and relationship satisfaction, potentially offers the best measure of relationship strength and provides the most insight into the impact on seller performance and buying decisions in a consumer context (De Cannière et al., 2007; De Wulf et al., 2001; Palmatier et al., 2006).

The context of organisational versus individual level relationships was examined and applied to the relationship quality construct and its underlying components of trust and commitment. It was identified that the relationship quality constructs and measures from the Palmatier (2008) study appear appropriate for the context of this study.
3. CHAPTER 3: RESEARCH MODEL DEVELOPMENT

3.1 Introduction

In Chapter 2, the theoretical elements of this study were reviewed in detail. In this chapter, the research objectives and research purpose first described in Chapter 1 are revisited and then a conceptual research model is developed together with detailed research hypotheses. The conceptual research model is introduced as a nomological model, that is the theoretical framework for what is to be examined, component frameworks and specification of the linkages among and between the frameworks (Cronbach & Meehl, 1955). Finally, the expected contribution of the research is restated, and the chapter concludes with a discussion of how the research questions and their underlying hypothesis are linked to the structural model to be used for empirical testing.

3.2 Research Purpose

This study seeks to develop a buying model for tax technology examining the relative importance of the attributes of the technology and other factors, such as price and quality of the relationship with the vendor of the technology in forming an intention to buy. To do this ‘Attitude to Use’ will be examined as a potential substitute for the quality of the product in traditional buying models. Attitude to Use is a construct, drawn from Technology Acceptance Model theory, representing an individual’s attitude to the behaviour that is use of the particular system or software (Davis, 1993).
The research objectives described in Chapter 1 are as follows:

1. To examine the extent to which a buying decision in relation to tax technology is linked to Attitude to Use of technology.

2. To assess the extent to which the Technology Acceptance Model principles appear to explain Attitude to Use in an organisational buying context, and are appropriate in the context of tax technology.

3. To assess the extent to which the inclusion of relationship quality in the theoretical model tested will enable a consumer based model to adequately explain a business buying scenario.

3.3 Research Questions

The research questions outlined in Chapter 1 are restated below to ground the development of the nomological model and research hypotheses set out below. Based on the review of literature in Chapter 2, the research questions can clearly be linked to previous theory in relation to the Technology Acceptance Model, relationship quality and buying models.

The first two research questions seek to operationalise the second research objective and are as follows:

1. Does the Technology Acceptance Model appear to be supported in the context of tax technology?
2. Does the Augmented Technology Acceptance Model appear to be supported in the context of organisational buying?

The next research question seeks to operationalise the third research objective and is as follows:

3. Does Relationship Quality influence Intention to Buy in the context of organisational buying of tax technology?

The next two research questions seek to operationalise the first research objective and are as follows:

4. Is Attitude to Use of the technology by the lead individual in the buying decision related positively to Perceived Value for Money of the technology?

5. Where Perceived Value for Money is positively related to Attitude to Use, is there a clear relationship between Perceived Value for Money and Intention to Buy the technology?

Finally, the last research question drawing together all of the above is as follows:

6. Can all of the relationships addressed above operate within a single explanatory model of Intention to Buy technology in a tax technology context?
3.4 Nomological Model

The research model in this study is fundamentally based on the Augmented Technology Acceptance Model (Taylor & Todd, 1995a), and Sweeney’s model of quality risk and value (1999). These are augmented by a Relationship Quality variable to recognise the fact that the study is considering a business to business context as opposed to the retail context of Sweeney (1999).

The chosen construct of Relationship Quality is derived from that used by Palmatier (2008) in a business to business context. Relationship Quality as a single construct is well supported (De Cannière et al., 2007; De Wulf et al., 2001; Rust et al., 1995).

A nomological model is a set of ‘laws’ that describe the relationships between different theoretical constructs and their effect upon one another, in such a way that those constructs and their relationships can be empirically tested (Cronbach & Meehl, 1955). In this regard, the nomological model is equivalent to a research model. The nomological model for this study is shown in Figure 18 below.
An initial question to be explored in developing the research model is whether the constructs in the model apparently reflect the key concepts in question from an intuitive perspective, that is whether it has ‘face validity’ (Bryman & Bell, 2007).

The above research model has clear face validity, since it is derived from the three established models described in the figure above, and uses the concept of value as a driver of intention to buy at its core, with the concept of value as an evaluation of benefits and sacrifices reflected within it. In the model, Attitude
to Use as a construct is taken to represent a measure of the perception of benefits and sacrifices associated with use of the technology – in other words, as a construct for the perceived product quality. This link between product quality and attitude to use is supported in literature (Holbrook & Corfman, 1985; Olshavsky, 1985; Zeithaml, 1988).

3.5 Hypotheses Development

Each of the latent variables in the model above is examined below together with related hypotheses.

3.5.1 Perceived Ease of Use

Perceived Ease of Use is defined as “the degree to which an individual believes that using a particular system would be free of physical and mental effort” (Davis, 1986, p. 26). Perceived Ease of Use is postulated by Davis et al. (1989) to have a causal effect on attitude towards use of the particular system or software, and hence on intention to use the software. Davis (1986) also postulates that Perceived Ease of Use will have a causal effect on the perceived usefulness of the particular software or system. The research model therefore in relation to Perceived Ease of Use postulates:

H1a: Perceived Ease of Use is positively related to Perceived Usefulness

H1b: Perceived Ease of Use is positively related to Attitude to Use
3.5.2 Perceived Usefulness

Perceived Usefulness is defined as “the degree to which a person believes a particular system would enhance his or her job performance” (Davis, 1986, p. 26). Perceived Usefulness is postulated by Davis (1989) to have a causal effect on attitude towards use of the particular system or software, and on intention to use the software. The model therefore in relation to Perceived Usefulness postulates:

H2a: Perceived Usefulness is positively related to Attitude to Use

H2b: Perceived Usefulness is positively related to Intention to Use

3.5.3 Subjective Norm

Subjective Norm has been defined as perception of the views of important others to the performance of the behaviour (Madden et al., 1992). It has been found that Subjective Norm can strongly influence business decisions in relation to adoption of technology by businesses (Yu & Tao, 2007). The Subjective Norm is present in the Theory of Reasoned Action, and Theory of Planned Behaviour, as a determinant of Intention – and is reflected as having a
relationship to Intention to Use in the Augmented TAM model (Taylor & Todd, 1995a). Intention to Use is only made possible by acquisition of the software and Intention to Buy the software is a prerequisite of Intention to Use. The model therefore in relation to Subjective Norm considers:

H3: Subjective Norm is positively related to Intention to Buy

3.5.4 Perceived Behavioural Control

Perceived Behavioural Control has been described as the individual’s perception that they cannot carry out the behaviour concerned due to external factors (Ajzen, 1991). In the context of the research question, the head of tax will be operating within an organisational framework, and may have perceptions about access to necessary internal IT support, ongoing funding for maintenance costs and a wide range of other factors.

Perceived Behavioural Control is reflected as having a relationship to Intention to Use in the Augmented TAM model (Taylor & Todd, 1995a). Intention to Use is only made possible by acquisition of the software and Intention to Buy the software is a prerequisite of Intention to Use. It is also possible that factors around access to resources as described above may directly impact on the buying decision (as a precursor to actual use). The model therefore in relation to Perceived Behavioural Control considers:
H4: Perceived Behavioural Control is negatively related to Intention to Buy

3.5.5 Attitude to Use

Attitude to Use is a construct representing an individual’s attitude to use of the particular system or software (Davis, 1993). Attitude to Use can be seen as a clear indicator in the context of the research question as to a belief about the quality of or value to be derived from the system or software concerned. It therefore can represent a proxy for perceived product quality (Holbrook & Corfman, 1985; Olshavsky, 1985; Zeithaml, 1988), and perceived product quality, in turn, is viewed as having a direct influence on perceived value for money (Sweeney et al., 1999). The model therefore in relation to Attitude to Use considers:

H5: Attitude to Use is positively related to Perceived Value for Money

3.5.6 Perceived Service Quality

In the analysis by Sweeney et al. (1999), it is asserted that Perceived Service Quality can impact on the perception of Value For Money. Perceived Service Quality can have both technical and functional dimensions, the technical being related to knowledge and operation of the product, and the functional relating to the general responsiveness and support shown in relation to ongoing
interactions in relation to the product (Sweeney et al., 1999). The model therefore in relation to Perceived Service Quality considers:

H6: Perceived Service Quality is positively related to Perceived Value for Money

3.5.7 Perceived Risk

Sweeney et al. (1999) observe that Perceived Risk can impact on the perception of Value For Money. Sweeney (1999, p. 81) defines perceived risk as “the subjective expectation of a loss”. Perceived Risk can have two dimensions – one financial (the risk of future financial loss or cost through product failure) and one performance related (failure to perform as expected) (Sweeney et al., 1999). The model therefore in relation to Perceived Risk considers:

H7: Perceived Risk is negatively related to Perceived Value for Money

3.5.8 Perceived Relative Price

In a business to business context, to some degree a buying decision will be influenced by price. The closer in nature two potential offerings are, excluding perceived price, then the greater the chance that a price differential
will be seen as unfair and that the cheaper offering will be chosen (Xia et al., 2004). Price should be considered at the level of perceived price as it is the perception of price that will impact on perceived value for money and hence willingness to buy (Zeithaml, 1988). The model therefore in relation to Perceived Relative Price considers:

H8: Perceived Relative Price is negatively related to Perceived Value for Money

3.5.9 Relationship Quality

Relationship Quality may be most appropriate as a construct when a researcher wants to capture the overall strength of relationship ties and investigate their impact on outcomes (Palmatier, 2008). Relationship Quality can be thought of as a higher order construct, being a synthesis of lower order components such as trust and commitment (De Cannière et al., 2007). Clearly in this context Relationship Quality could impact on Perceived Risk (for example, trust could reduce perceived risk) (Chang & Chen, 2008) and on the ultimate buying decision (for example, through loyalty and commitment) (Canniere et al., 2010). The model therefore in relation to Relationship Quality considers:

H9a: Relationship Quality is negatively related to Perceived Risk
H9b: Relationship Quality is positively related to Intention to Buy

3.5.10 Perceived Value for Money

Perceived Value for Money has been regarded as a construct of perceived quality, perceived risk and perceived relative price (Sweeney et al., 1999). Perceived Value for money has been shown to be a key driver of buying decisions in a retail context, but care must be taken in a business to business context where relationships may be an equally important driver through enabling differentiation (Ulaga & Eggert, 2006). Sweeney (1999) has demonstrated how the buying decision is positively related to Perceived Value for Money. The model therefore in relation to Perceived Value for Money considers:

H10: Perceived Value for Money is positively related to Intention to Buy

3.5.11 Intention to Buy

The construct for Intention to Buy is based on the Willingness to Buy construct outlined by Sweeney et al. (1999).

The key constructs (latent variables) and related hypotheses described above are set out below in Figure 19 in diagrammatic form. This represents the initial structural model of the relationships between the identified constructs.
Figure 19: Hypothesised Model
3.6 Linking Hypotheses to Research Questions

Each of the research questions is linked to the relevant hypotheses in turn below. The final research question is linked to analysis of the entire structural model and the concept of fit.

3.6.1 First Research Question

The first research question states: Does the Technology Acceptance Model appear to be supported in the context of tax technology?

This was examined in a pilot study as described in Chapters 4 and 5 below, looking at the final Technology Acceptance Model (Venkatesh & Davis, 1996). The first research question has to be addressed outside the context of a buying decision as the second research question builds on the first by introducing that context. For this reason, the first research question does not directly link to hypotheses in the main study.

3.6.2 Second Research Question

The second research question states: Does the Augmented Technology Acceptance Model appear to be supported in the context of organisational buying?

In the context of the main study and the hypotheses outlined above, this question is examined by the following hypotheses:
**H1a:** Perceived Ease of Use is positively related to Perceived Usefulness

**H1b:** Perceived Ease of Use is positively related to Attitude to Use

**H2a:** Perceived Usefulness is positively related to Attitude to Use

**H2b:** Perceived Usefulness is positively related to Intention to Buy

**H3:** Subjective Norm is positively related to Intention to Buy

**H4:** Perceived Behavioural Control is negatively related to Intention to Buy

### 3.6.3 Third Research Question

The third research question states: Does Relationship Quality influence Intention to Buy in the context of organisational buying of tax technology?

In the context of the main study and the hypotheses outlined above, this question is examined by the following hypothesis:

**H9b:** Relationship Quality is positively related to Intention to Buy

### 3.6.4 Fourth Research Question
The fourth research question states: Is Attitude to Use of the technology by the lead individual in the buying decision related positively to the Perceived Value for Money of the technology?

In the context of the main study and the hypotheses outlined above, this question is examined directly by the following hypothesis:

\[ H5: \text{Attitude to Use is positively related to Perceived Value for Money} \]

### 3.6.5 Fifth Research Question

The fifth research question states: Where Perceived Value for Money is positively related to Attitude to Use, is there a clear relationship between Perceived Value for Money and Intention to Buy the technology?

In the context of the main study and the hypotheses outlined above, this question is examined directly by the following hypothesis:

\[ H10: \text{Perceived Value for Money is positively related to Intention to Buy} \]

### 3.6.6 Sixth Research Question
The sixth research question states: Can all of the relationships addressed above operate within a single explanatory model of Intention to Buy technology in a tax technology context?

All of the hypotheses in the model help to examine the above research question. Most importantly, however, this question is addressed by examining the whole research model through Structural Equation Modelling, a statistical technique described more fully in Chapter 4, but specifically utilising sample data to determine the extent to which the theorised model is supported (Schumacker & Lomax, 2004).

3.7 Conclusion

In this chapter, a framework research model and related detailed hypotheses were developed to help address the stated research questions. The hypotheses and components of the model were developed from the theories examined in the literature review. Each research question was linked to either discrete hypotheses, or in the case of the first and sixth research questions, to the pilot study (which utilised structural equation analysis) and to the main study’s structural model for structural equation analysis respectively.
4. CHAPTER 4: RESEARCH METHODOLOGY

4.1 Introduction

This chapter starts with a discussion of the research approach adopted in this study, exploring the epistemological position and research paradigm adopted. It outlines how this informs model development, data collection and data analysis. The chapter then discusses how a structural model has been developed from extant literature, and outlines the derived hypotheses to be tested empirically.

The chapter then discusses the identification of the measurement model and describes in detail each of the measurement scales to be used in conjunction with the constructs in the structural model. It goes on to describe how these scales are to be used in the chosen data collection method, a web based survey. Use of a survey method and related issues are discussed. A brief commentary on the approach to data analysis to be undertaken is presented. This commentary describes key components of the structural equation analysis to be completed.

The chapter then describes a pilot study undertaken as part of this research to test the application of Technology Adoption Theory in the context of professional services. Finally, the chapter concludes with a discussion of the ethical considerations relevant in the context of this research.
4.2 Research Paradigm

A research paradigm represents ‘a cluster of beliefs’ which influence how research should be conducted and how results should be interpreted (Kuhn, 1970). This cluster of beliefs includes a stance on ontology, epistemology, methodology and axiology (Jennings, 2005).

Ontology refers to the study of the nature of existence or being, and whether it is an objective or subjective matter in any given case (Blaikie, 2007). Epistemology is the theory of knowledge and concerns ‘the sources and limits of knowledge’ (Eriksson & Kovalainen, 2008). Methodology refers to a research strategy which guides the research methods and procedures adopted (Creswell, 2008). Axiology concerns the role of the researcher’s values in the research process (Ponterotto, 2005).

The research paradigm adopted in this study is that of Post or Neo-positivism, which is fundamentally grounded in the Positivism tradition. Positivism concerns the application of the scientific method to social research, involving empirical research and testing hypothesis, to identify generalisable results (Gray, 2009). Positivism typically involves empirical investigation of a theory specifying a causal model, using empirical data to test a set of related hypotheses (Turner, 1985).
Positivism is often contrasted with Interpretivism, which holds that in a social sciences setting, knowledge is subjective, highly contextual and cannot easily be generalised (Saunders et al., 2011). Interpretivism is more strongly associated with qualitative research and often involves interpretation of the thoughts and feelings of social actors in a given time and place without generalization (Saunders et al., 2011).

The contrasting research paradigms are summarised in Table 10 below, derived from a similar table from Jennings (2005).

<table>
<thead>
<tr>
<th>Descriptors</th>
<th>Positivism</th>
<th>Interpretivism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Origins</td>
<td>Founded in the hard/natural sciences</td>
<td>Founded in human (social) sciences</td>
</tr>
<tr>
<td>Focus</td>
<td>Explanation, realism, objectivism</td>
<td>Understanding, relativism, perspectivism</td>
</tr>
<tr>
<td>Ontology</td>
<td>Truth and laws are universal</td>
<td>Multiple perspectives/realities</td>
</tr>
<tr>
<td>Epistemology</td>
<td>Objective</td>
<td>Subjective</td>
</tr>
<tr>
<td>Methodology</td>
<td>Quantitative</td>
<td>Qualitative</td>
</tr>
<tr>
<td>Axiology</td>
<td>Value free: extrinsic purpose of research project</td>
<td>Value laden: intrinsic focus of the research project</td>
</tr>
</tbody>
</table>

This study considers human decision making in a given context. It attempts to build on a tradition of positivistic research approaches taken to the study of
human behaviour, and recognizes that positivistic approaches predominate in business research (Jennings, 2005). It attempts to test a theory and hypotheses that seek to explain technology buying behaviour in a generalisable way for business benefit. This accords with the normal process under a positivistic approach (Hussey & Hussey, 1997).

Post-positivism is a response to criticisms of positivism that reality cannot be perfectly understood and measured, research findings can never be true, only probably true, and that some use of qualitative measures can help refine the quantitative approach (Struwig et al., 2001). Post-positivism recognises that absolute objectivity is not possible, and that conclusions are probable but not certain (Crotty, 1998). Post-positivism embraces the method of hypothetic-deduction which examines theory by way of attempts to falsify hypotheses derived from the theory through empirical testing (Popper, 2002). This study adopts this approach.

4.3 Research Model and Hypotheses

The Research Model introduced as a nomological model in Chapter 3 is described below. The hypotheses also developed in Chapter 3 are then summarised and linked to the structural research model.

4.3.1 Research Model
The nomological model (theoretical framework) for the research developed in Chapter 3 is set out again for ease of reference below in Figure 20. The model illustrates the key latent variables in the research model, and illustrates the three key previous research models they are derived from.

The research hypotheses developed in Chapter 3 are also represented in Figure 21 below, in the form of a structural model. The model shows the hypothesised relationships between the latent variables.

Figure 20: Nomological Model
Figure 21: Structural Model
4.3.2 Research Hypotheses

The hypotheses derived in Chapter 3 and represented in the diagram above are reproduced below in summary form.

H1a: Perceived Ease of Use is positively related to Perceived Usefulness

H1b: Perceived Ease of Use is positively related to Attitude to Use

H2a: Perceived Usefulness is positively related to Attitude to Use

H2b: Perceived Usefulness is positively related to Intention to Buy

H3: Subjective Norm is positively related to Intention to Buy

H4: Perceived Behavioural Control is negatively related to Intention to Buy

H5: Attitude to Use is positively related to Perceived Value for Money

H6: Perceived Service Quality is positively related to Perceived Value for Money

H7: Perceived Risk is negatively related to Perceived Value for Money

H8: Perceived Relative Price is negatively related to Perceived Value for Money

H9a: Relationship Quality is negatively related to Perceived Risk

H9b: Relationship Quality is positively related to Intention to Buy
H10: Perceived Value for Money is positively related to Intention to Buy

4.4 Measurements

The structural model outlined above is comprised of 11 constructs. In order to measure these constructs, existing scales for the constructs from previous research were adapted for context. The use of established scales should reduce concerns regarding construct validity. The measurement items (observed variables) are set out below in Tables 11 to 21. Each of the constructs (latent variables) were measured with reflective scales and as such a change in the related construct should result in a change in its indicators or measures (Hair et al., 2010).

Table 11: Measures of Perceived Value for Money

<table>
<thead>
<tr>
<th>Perceived Value For Money (PVM)</th>
<th>Adapted from</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PVM1</strong>: This technology offering is good value for money.</td>
<td>(Sweeney et al., 1999)</td>
</tr>
<tr>
<td><strong>PVM2</strong>: This technology offering is a good buy.</td>
<td></td>
</tr>
<tr>
<td><strong>PVM3</strong>: At the price quoted the offering is economical.</td>
<td></td>
</tr>
</tbody>
</table>
### Table 12: Measures of Perceived Service Quality

<table>
<thead>
<tr>
<th>Perceived Service Quality</th>
<th>Adapted from</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PSQ1</strong>: The team selling the technology offering had the knowledge to answer my questions.</td>
<td>(Sweeney et al., 1999)</td>
</tr>
<tr>
<td><strong>PSQ2</strong>: The team selling the technology offering knew what they were talking about.</td>
<td></td>
</tr>
<tr>
<td><strong>PSQ3</strong>: The team supporting the technology offering were willing to help me.</td>
<td></td>
</tr>
</tbody>
</table>

### Table 13: Measures of Perceived Risk

<table>
<thead>
<tr>
<th>Perceived Risk</th>
<th>Adapted from</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PR1</strong>: This technology offering is not risky in terms of how it might perform.</td>
<td>(Sweeney et al., 1999)</td>
</tr>
<tr>
<td><strong>PR2</strong>: This technology will not be expensive to operate and maintain.</td>
<td></td>
</tr>
<tr>
<td><strong>PR3</strong>: There is a no real chance this technology will not work properly.</td>
<td></td>
</tr>
</tbody>
</table>
Table 14: Measures of Relationship Quality

<table>
<thead>
<tr>
<th>Relationship Quality</th>
<th>Adapted from</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RQ1 (Commitment):</strong> We are willing “to go the extra mile” to work with the organisation providing the technology offering.</td>
<td>(Palmatier, 2008)</td>
</tr>
<tr>
<td><strong>RQ2 (Commitment):</strong> We view the relationship with the organisation providing the technology as a long-term partnership.</td>
<td></td>
</tr>
<tr>
<td><strong>RQ3 (Trust):</strong> We have trust in the organisation providing the technology offering.</td>
<td></td>
</tr>
<tr>
<td><strong>RQ4 (Trust):</strong> The organisation providing the technology offering is trustworthy.</td>
<td></td>
</tr>
<tr>
<td><strong>RQ5 (Reciprocity):</strong> There is an expectation of reciprocity guiding our relationship with the organisation providing the technology offering.</td>
<td></td>
</tr>
<tr>
<td><strong>RQ6 (Reciprocity):</strong> We (my organisation and the organisation providing the technology offering) would help each other without expecting an immediate favour in return.</td>
<td></td>
</tr>
<tr>
<td><strong>RQ7 (Exchange Efficiency):</strong> Our dealings with the organisation providing the technology offering are very efficient.</td>
<td></td>
</tr>
</tbody>
</table>
Table 15: Measures of Perceived Relative Price

<table>
<thead>
<tr>
<th>Perceived Relative Price</th>
<th>Adapted from</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PRP1</strong>: The price of this technology is low relative to other technology offerings with similar features.</td>
<td>(Sweeney et al., 1999)</td>
</tr>
<tr>
<td><strong>PRP2</strong>: How would you rate the price of this technology offering relative to other technology offerings with similar features?</td>
<td></td>
</tr>
<tr>
<td><strong>PRP3</strong>: The price of this technology is reasonable when compared to similar technology offerings.</td>
<td></td>
</tr>
</tbody>
</table>

Table 16: Measures of Subjective Norm

<table>
<thead>
<tr>
<th>Subjective Norm</th>
<th>Adapted from</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SN1</strong>: People who influence my behaviour think we should use the technology</td>
<td>(Viswanath Venkatesh &amp; Fred D. Davis, 2000)</td>
</tr>
<tr>
<td><strong>SN2</strong>: People who are important to me think we should use the technology</td>
<td></td>
</tr>
<tr>
<td><strong>SN3</strong>: Fellow members of the tax function whose views I respect think we should use the technology</td>
<td></td>
</tr>
</tbody>
</table>
Table 17: Measures of Intention to Buy

<table>
<thead>
<tr>
<th>Intention to Buy</th>
<th>Adapted from</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ITB1</strong>: I would consider buying this technology offering from this organisation.</td>
<td>(Sweeney et al., 1999)</td>
</tr>
<tr>
<td><strong>ITB2</strong>: There is a strong likelihood that I will buy this technology offering.</td>
<td></td>
</tr>
<tr>
<td><strong>ITB3</strong>: I am very likely to purchase this technology offering</td>
<td></td>
</tr>
</tbody>
</table>

Table 18: Measures of Perceived Ease of Use

<table>
<thead>
<tr>
<th>Perceived Ease of Use</th>
<th>Adapted from</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PEOU1</strong>: I find the technology clear and understandable.</td>
<td>(Venkatesh &amp; Davis, 1996)</td>
</tr>
<tr>
<td><strong>PEOU2</strong>: Interacting with the technology would not require a lot of mental effort</td>
<td></td>
</tr>
<tr>
<td><strong>PEOU3</strong>: I would find it easy to get the technology to do what I want it to do</td>
<td></td>
</tr>
</tbody>
</table>
Table 19: Measures of Perceived Usefulness

<table>
<thead>
<tr>
<th>Perceived Usefulness</th>
<th>Adapted from</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PU1</strong>: Using the technology would improve productivity in our tax function.</td>
<td>(Venkatesh &amp; Davis, 1996)</td>
</tr>
<tr>
<td><strong>PU2</strong>: I feel the technology would be useful in our tax function.</td>
<td></td>
</tr>
<tr>
<td><strong>PU3</strong>: Using the technology would improve the effectiveness of our tax function.</td>
<td></td>
</tr>
</tbody>
</table>

Table 20: Measures of Attitude to Use

<table>
<thead>
<tr>
<th>Attitude to Use</th>
<th>Adapted from</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ATU1</strong>: All things considered, using the technology in the tax function would be good.</td>
<td>(Davis, 1993)</td>
</tr>
<tr>
<td><strong>ATU2</strong>: All things considered, using the technology in the tax function would be wise.</td>
<td></td>
</tr>
<tr>
<td><strong>ATU3</strong>: All things considered, using the technology in the tax function would be favourable.</td>
<td></td>
</tr>
<tr>
<td><strong>ATU4</strong>: All things considered, using the technology in the tax function would be beneficial.</td>
<td></td>
</tr>
<tr>
<td><strong>ATU5</strong>: All things considered, using the technology in the tax function would be positive.</td>
<td></td>
</tr>
</tbody>
</table>
Table 21: Measures of Perceived Behavioural Control

<table>
<thead>
<tr>
<th>Perceived Behavioural Control</th>
<th>Adapted from</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PBC1</strong>: I have control over whether we use the technology.</td>
<td>(Venkatesh et al., 2003)</td>
</tr>
<tr>
<td><strong>PBC2</strong>: I have the resources necessary to use the technology.</td>
<td></td>
</tr>
<tr>
<td><strong>PBC3</strong>: The system is not incompatible with other systems I use.</td>
<td></td>
</tr>
</tbody>
</table>

The above measures are integrated into the structural equation model for the research in the diagram set out in Figure 22 below. Each of the measures is linked to the relevant latent (not direct measurable or observable) variable in the research model developed in Chapter 3. In each case, the measures are represented as reflective measures, discussed below. For this reason, in the diagram, arrows are drawn from the latent constructs to the measures reflecting the flow of assumed causality.
Figure 22: Measurement and Structural Model
All of these measures are treated as reflective in line with the main body of the literature. They are measured and tested as reflective measures. Reflective versus formative scales are discussed briefly below.

With reflective (or effect) measurement models, causality flows from the latent construct to the indicator or measure. In other words, a change in the latent construct (such as perceived ease of use) should result in a corresponding change in the measurement variable (such as PEOU1 in figure 22). In Structural Equation Modelling (SEM) reflective indicators are usually used, and in fact LISREL (a well established software package for SEM) indicators are by default reflective (Diamantopoulos & Siguaw, 2000). A reflective measure assumes that all measurement items are caused by the same latent construct; therefore, they are highly correlated with each other (Hair et al. 2010).

By way of contrast, in some cases, indicators could be viewed as causing rather than being caused by the latent variable measured by the indicators. In these circumstances, the indicators are known as formative; changes in the indicators cause changes in the value of the latent variable rather than the other way around (Diamantopoulos & Siguaw, 2006). In the case of formative models, measurement error is an inability to fully explain the construct (because the construct is merely represented as the aggregate of the
measures - the measures produce the construct). In reflective models measurement error arises due to an inability to fully explain the measures (Hair et al., 2010). For this reason, Structural Equation Modelling involves testing and evaluating measurement errors as part of the statistical analysis process (Diamantopoulos & Siguaw, 2000).

Diamantopoulos & Winklhofer (2001, p. 274) state that:

“The choice between a formative and a reflective specification should primarily be based on theoretical considerations regarding the causal priority between the indicators and the latent variable involved”.

In this study, it is clear that the latent variables are theoretically defined on the basis that they causally affect the measurement variables or indicators. In addition, the measurement items for each construct are taken from previous studies in which they were found to be highly correlated and interchangeable, another indicator of their reflective nature (Diamantopoulos & Winklhofer, 2001).

4.5 Data Collection and Sample Strategy

In line with the Positivist research paradigm, a quantitative approach to testing the hypotheses outlined was adopted. Survey administration is the most commonly utilised method of data collection within the quantitative approach (Desai & Potter, 2006). In this (main) study, a web based survey technique utilising Qualtrics software was adopted, with respondents invited
to take the survey via email on an anonymous response basis. Using an Internet based questionnaire has the key advantages of reduction in human error in collation, accuracy, convenience, speed and reduced cost (McMellon & Schiffman, 2001).

The context of this study is the buying of tax technology. For this reason, tax specialists in larger businesses, typically heads of tax or senior tax personnel were deemed most appropriate to complete the questionnaire. These are considered to be key informants in the context of this study, and identifying key informants is recommended to reduce response error and problems with perceptual agreement (Kumar et al., 1993).

An initial set of control questions to collect demographic information was designed for the questionnaire. In relation to the respondent, data on gender and age was collected. In relation to the organisation, data on the size of the global tax function and the industry of the organisation was requested. In addition, questions as to the type of technology under consideration and whether or not the procurement function of the organisation was involved were used. In order to ensure that all respondents were actively involved in a technology buying decision, an initial screening question with a yes or no answer was used. A negative response (not currently considering buying tax technology) terminated the survey.
The measurement scales were based on seven point Likert scale responses. A Likert scale is one of the scales most frequently used to measure attitudes and behaviours in business research (Cavana et al., 2001). The fact that they are easy to understand is seen as a key benefit (Malhotra & Birks, 2007). As Likert scales also possess an inherent ability to induce several types of response error, a maximum of seven response categories is recommended (Lozano et al., 2008).

For each of the scale items, respondents were asked to indicate the extent to which they agreed or disagreed with the statement. A range of Strongly Disagree to Strongly Agree was used. One exception to this was for measurement PRP2: “How would you rate the price of this technology offering relative to other technology offerings with similar features?” For this item a range of Very High to Very Low was used.

The measures and questions were placed in random order using the Qualtrics software in order to minimise the risk of priming. Priming arises when respondents are primed to think about one issue in answering a first question, and then answer a subsequent question that is related. This is of concern when questions representing measures of the same latent variable are grouped together.
As a pre-test in advance of formal data collection, five senior heads of tax were sent the main study questionnaire in advance, and asked to complete it and then to discuss the experience. In particular these respondents were asked to point out ambiguous questions, comment on major factors influencing their thinking not covered by the questionnaire, and comment on demographic questions. Slight amendments to question wording, and changes to categories in the demographic questions were all that were suggested by these respondents.

### 4.6 Structural Equation Modelling

#### 4.6.1 Introduction to Structural Equation Modelling

The data gathered using the questionnaires was tested using Structural Equation Modelling (SEM). SEM is a highly utilised and sophisticated statistical technique allowing researchers to examine theory driven causal research questions, at both latent and observed variable level (Hancock & Mueller, 2006).

SEM combines path models (the relationships between latent variables) and confirmatory factor models (analysis of observed variables) (Schumacker & Lomax, 2004). The relationship between each latent variable (unobservable construct) and its observed variables (measures) is often called the measurement model (Diamantopoulos & Siguaw, 2000). The relationship
between latent variables is often called the structural model (Diamantopoulos & Siguaw, 2000).

There is a risk that a research model is overcomplicated and becomes impossible to analyse with sufficient empirical data and sufficient statistical power to be statistically valid. If a model contains too many constructs and variables, it may be adversely affected by random error or noise in the data unless significant volumes of empirical data can be obtained to retain a sample size sufficient to identify all parameters and retain statistical power in the statistical model (Schumacker & Lomax, 2004). This is discussed further in Chapter 6.

4.6.2 Structural Equation Modelling and Non-Normal Data

Structural Equation Modelling has been criticized in relation to its use in handling ordinal data such as that derived from the use of Likert scales (Kupek, 2006). This data is inherently non-normal and therefore use of estimators based on assumptions of normality must be approached with caution (Kaplan, 2000). Even where data is severely non-normal and ordinal, use of Maximum Likelihood (a normal theory estimator) together with Satorra-Bentler scaling has been advocated where there are at least 5 ordered categories (Finney & DiStefano, 2006). There are seven ordered categories for each measure used in this study. This approach was undertaken using Lisrel software, which accommodates Satorra-Bentler scaling.
Satorra-Bentler scaling involves adjusting the $\chi^2$, fit indices and standard errors output from use of a Maximum Likelihood estimator by a scaling factor calculated by reference to the amount of non-normality in the data. This is to correct for bias in the estimation caused by even moderate non-normal data. The scaling factor (d) incorporates the kurtosis of the variables. The formula $S\text{-}B \chi^2 = d^{-1}(\text{ML based } \chi^2)$ represents the relationship. Empirical study has shown that Satorra-Bentler scaling significantly outperformed ordinary Maximum Likelihood in relation to $\chi^2$ and fit indices (Green, Akey, Fleming, Hershberger, & Marquis, 1997) for non-normal ordered categorical data. Similarly research has found that Satorra-Bentler scaled standard errors were more precise than standard Maximum Likelihood standard errors (DiStefano, 2002).

### 4.6.3 Structural Equation Modelling and the Measurement Model

The construct validity of the measurement model concerns the extent to which the observed variables correctly reflect the latent variable that they are meant to represent. The concept of construct validity is the general indicator of this, but subsumes convergent validity, discriminant validity and unidimensionality (Kline, 2010).

Convergent validity is achieved when a set of measurement variables have a high proportion of variance in common. In Structural Equation Modelling this
can be assessed by looking at standardised factor loadings and reliability. Reliability means that the measurement variables should be highly correlated to one another (Kline, 2010). Factor loadings of 0.5 or larger are considered as significant (Hair et al., 2010).

Reliability of individual measurement variables can be measured by the Cronbach’s alpha coefficient. Cronbach’s alpha coefficient is a measure of internal consistency, and increases as intercorrelation between measures of a latent variable increase. As a minimum a value of greater than 0.6 is required (Garson, 2010), although 0.7 is often quoted as a lowest limit (Hair et al., 2010). Composite reliability refers to a measure of the reliability of the whole construct and can be calculated as

$$\text{Composite Reliability (CR)} = \frac{\left( \sum_{i=1}^{n} \lambda_i \right)^2}{\left( \sum_{i=1}^{n} \lambda_i^2 \right) + \left( \sum_{i=1}^{n} e_i^2 \right)}$$

Where $\lambda_i$ denotes the standardised factor loading for item $i$ and $e_i$ is the error variance term. Composite reliability is affirmed if the reliability estimate is greater than 0.7 (Gerbing & Anderson, 1988).

Discriminant validity is achieved when a construct shares more variance with the observed variables that measure it than with other constructs (Hair et al., 2010). If there is discriminant validity between two constructs, their AVE
(Average Variance Extracted) should be higher than the squared correlation estimate between the two constructs (Hair et al., 2010). AVE is calculated for each construct as:

\[
AVE = \frac{\sum_{i=1}^{n} \lambda_i^2}{\sum_{i=1}^{n} \lambda_i^2 + \sum_{i=1}^{n} e_i}
\]

where \(\lambda_i\) denotes the standardised factor loading for item \(i\) and \(e_i\) is the error variance term.

Unidimensionality refers to the principle that measurement variables should represent only one underlying latent variable. If there are significant cross factor loadings this can imply a lack of construct validity (Hair et al., 2010).

4.6.4 Structural Equation Modelling and the Structural Model

The structural model is assessed based on goodness of fit measures. Several measures and indices are used in the literature. These measures include CFI, RMR, SRMR and RMSEA (Bentler, 2007). CFI is an incremental fit index, which assesses model fit relative to an alternative base model (Hair et al., 2010). SRMR, RMR and RMSEA are absolute fit indices measuring how well the theory fits the sample data (Hair et al., 2010). The comparative fit index (CFI) benefits from the fact that it adjusts for the issues of sample size.
inherent in the chi-squared test of model fit (Gatignon, 2010). Similarly RMSEA has the benefit of being relatively independent of sample size (Browne et al., 1993). SRMR is sample size dependent as a measure so care needs to be taken with absolute cutoff measures when determining fit (Hu & Bentler, 1999).

A two index strategy for evaluating model fit is recommended by Hu and Bentler (1999). They show through empirical testing that using a combination of two fit indices, one incremental and one absolute, performs better in identifying miss-specified models than any single index. Based on empirical studies, in relation to small sample sizes (<250) and non-normal data, they recommend SRMR instead of RMSEA as an absolute fit index, to be used in conjunction with one of a number of incremental fit indices such as CFI (Hu & Bentler, 1999). In general they recommend a cut off value of >.96 for CFI combined with SRMR <0.10 (Hu & Bentler, 1999).

4.7 Pilot Study

In advance of the main research survey, a pilot study was undertaken to investigate the appropriateness of using The Technology Acceptance Model in relation to tax technology to be used by tax specialists. A secondary objective of the pilot study was to gain experience in Structural Equation Modelling and the use of Lisrel. In order to progress towards the main research objective and the first research question established in Chapter 3, a revised research question
was developed. This revised question seeks to look at confirming the applicability of the technology acceptance model in a specific, constrained set of circumstances:

**Does the Technology Acceptance Model help predict intention to use a tax website (ITWH) provided by a professional services firm?**

An additional and ancillary research question for the Pilot Study was also developed, to investigate an original concept related to the impact of brand on trust in circumstances where the technology has a high degree of tax technical content:

**What is the impact of brand trust on intention to use that website?**

The pilot study involved the submission of a questionnaire to approximately 900 tax specialists in UK businesses who (freely) subscribed to an Indirect Tax news website (called ‘Indirect Tax Weekly Highlights’ or ‘ITWH’) offered by the accountancy firm PwC. Such sites are widely available in the UK, and most tax professionals will review multiple sites and subscribe to more than one for at least a short period. ITWH users receive news by way of an e-mail summary, which has links to detailed and comprehensive tax information. The website has additional and sophisticated functionality and a repository of historic tax case law and news. Content in the website is
provided by PwC indirect tax specialists. Users can unsubscribe simply at any time, or simply cease to use the site.

The purpose of ITWH is to help create ties between PwC and organisations with whom it wishes to business. The information provided by PwC via ITWH, following a free subscription by organisations, can take place before, between or in parallel with financial transactions with organisations. Its purpose is to create ties and relationships between PwC and the subscribing organisation, an example of an activity being undertaken in order to make a resource freely available to other actors in a network context (Hakansson & Snehota, 1989).

The questionnaire examined measures for four latent variables. Three of those variables (and measures) were drawn directly from technology adoption theory, being Perceived Ease of Use and Perceived Usefulness (Davis et al., 1989) and Intention to Use (Venkatesh & Davis, 1996). The fourth variable, Brand, was constructed from first principles, and envisaged a combination of Brand Reliance and Brand Strength. The measures used for the variables are listed below in Table 22.

It is not unusual for Attitude to Use to be excluded and Intention to Use retained. In a meta-study, Legris et al. (2003) identified eight studies which only included Intention to Use and excluded the Attitude to Use variable.
Table 22: Pilot Model Measures

<table>
<thead>
<tr>
<th>Code</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perceived Ease of Use</strong></td>
<td></td>
</tr>
<tr>
<td>PEOU1</td>
<td>Getting the information I want from itwh is easy</td>
</tr>
<tr>
<td>PEOU2</td>
<td>Becoming skillful at using the itwh site was difficult</td>
</tr>
<tr>
<td>PEOU3</td>
<td>Learning to use itwh is easy</td>
</tr>
<tr>
<td><strong>Perceived Usefulness</strong></td>
<td></td>
</tr>
<tr>
<td>PU1</td>
<td>itwh improves my performance in tax research</td>
</tr>
<tr>
<td>PU2</td>
<td>Itwh does not enhance my effectiveness in tax research</td>
</tr>
<tr>
<td>PU3</td>
<td>itwh increases my productivity in searching for indirect tax information</td>
</tr>
<tr>
<td><strong>Intention to Use</strong></td>
<td></td>
</tr>
<tr>
<td>IU1</td>
<td>I am very likely to use the itwh website in future</td>
</tr>
<tr>
<td>IU2</td>
<td>I predict that I will not use itwh website in future</td>
</tr>
<tr>
<td>IU3</td>
<td>Given I have access to itwh, I will use it</td>
</tr>
<tr>
<td><strong>Brand</strong></td>
<td></td>
</tr>
<tr>
<td>BRDRLY1</td>
<td>PwC is not a reliable source of tax information</td>
</tr>
<tr>
<td>BRDRLY2</td>
<td>PwC will have accurate and meaningful insights into tax changes and developments</td>
</tr>
<tr>
<td>BRDSTR1</td>
<td>PwC is a recognised leading professional services firm</td>
</tr>
<tr>
<td>BRDSTR2</td>
<td>PwC does not have a good reputation in the marketplace</td>
</tr>
</tbody>
</table>

The structural model for the pilot study is described in Figure 23 below.

Within the model, the brand construct seeks to identify whether confidence in PricewaterhouseCoopers, the organisation behind the ITWH website, influences intention to use the site in future.
The hypotheses relating to the variables PU, PEOU and IU are as drawn from technology acceptance model theory measurements used in a similar study (Gefen et al., 2000).

The brand related hypotheses postulate that:

H3a: Brand is positively related to Perceived Usefulness.

H3b: Brand is positively related to Intention to Use

These hypotheses are based on the expectation that a positive view on the brand will positively influence ITWH users of the usefulness of the website and intention to use it.

The above pilot model was tested using Structural Equation Modelling and the Lisrel software. The results are discussed in Chapter 5 below.
4.8 Ethical Considerations

In both the pilot study and the main study, all surveyed participants were presented with a statement that explained the purpose of the study and outlined that all responses would be recorded on an anonymous basis to ensure confidentiality and reduce evaluation apprehension (concern as to what a researcher is looking for) which could lead to bias in responses (Rosenberg, 1965).

4.9 Conclusion

In this chapter, the research paradigm adopted in the thesis, post-positivism, was described. The chapter went on to outline the research methodology undertaken building on the research model developed in Chapter 3. This involved development of measures for each of the variables in the research model in the form of questions for which Likert scale responses would be requested. The resultant measurement model was then illustrated. The difference between reflective and formative measurement models was explored. The chapter went on to discuss Structural Equation Modelling and the approach to testing both the measurement and structural model once empirical data had been collected.
This chapter also introduced the research model for the Pilot Study and outlined the relevant research hypotheses and measures to be used in testing empirical data to be gathered using electronic questionnaires.
5. CHAPTER 5: PILOT STUDY DATA COLLECTION AND RESULTS

5.1 Introduction

The research model and research method for the Pilot Study was outlined in Chapter 4 above. This Chapter describes the Pilot Study in more detail and explains how the data collection and analysis was conducted. It includes detailed analysis of both the measurement model and structural model using Structural Equation Modelling techniques.

5.2 Survey Method and Procedure

As described above, 900 tax specialists who had subscribed to a free indirect tax knowledge web news service (“ITWH”) were identified as a population. These individuals received in a newsletter notification one week in advance that a survey link would be emailed to them and that they would be asked to complete the short survey on an anonymous basis. It was made clear that the survey was optional and that the results would be used as a doctoral student research project at Manchester Business School. It was highlighted that feedback given in the survey would also help the process of ongoing improvement to the ITWH service.

Each of the 900 specialists received a link to a web based survey containing the questions set out in Appendix A. The survey tool used was the mbsselect
survey tool. This was an online survey tool provided by Manchester Business School. Before the questionnaire was issued, it was pre-tested with 5 tax managers from organisations both using and not using the ITWH website to ensure that the questions and instructions in the covering email and questionnaire were clear and meaningful, and not ambiguous. This was achieved by sending them the questionnaire then making a follow-up call to discuss it. The process was repeated with 5 PwC colleagues. Pre-test participants were excluded from the surveyed group.

The introduction to the survey attempts to ensure that the background to the research was understood and provides links to the ITWH website and a specific function for consistency. It is reproduced below in italics:

*Thank you for participating in this research project which looks at factors influencing intention to use a website.*

*As part of a study of Internet use for the purposes of doctoral research, we would be grateful if you could devote 10 minutes to completing this instrument. The responses made will be treated as completely confidential and form part of an overall statistical analysis only.*

*Before completing this survey, you should have:*
1. Logged on to the Internet at https://itwh.pwc.com/ and signed on using your user name and password.
2. Used the Web-site to search for commentary on the 2006 European Court of Justice (ECJ) judgement in a VAT case involving Halifax plc.

After being initially sent, three reminders were sent over the following 5 weeks. A donation to charity was offered in the final reminder conditional on over 200 responses being received, as incentive. Only 175 responses were
ultimately received (the population targeted consisted of about 900 users of the e-mail tax news service). The donation to charity was made however. On receipt of results, any survey responses with single responses throughout (e.g. all scored 7) or incomplete were removed. Only about 9 survey responses met this criterion. A total of 166 surveys formed the final data set (around an 18% response rate).

Generally for Structural Equation Modelling, a minimum acceptable size of between 100 and 150 respondents appears to be required (Anderson & Gerbing, 1988). Researchers frequently cite 5 or 10 observations per indicator or measurement variable in setting a lower bound for the adequacy of sample sizes (Westland, 2010). Ideally a statistical power based approach to sample size should be taken, with a sample size reached that ensures the statistical power exceeds the traditional 0.8 level (Schumacker & Lomax, 2004).

Minimum sample size does not have a linear relationship with the number of measurement variables (Marsh et al., 1998). Complexities which increase information demands (degrees of freedom) in structural model estimation increase in line with the number of potential combinations of latent variables. The information supplied for estimation to meet those demands increases with the number of measured parameters times the number of observations in the sample size. Both are non-linear (Westland, 2010). The sample size required is reduced as the number of measures per latent variable increases (again in a
non-linear fashion) (Marsh et al., 1998). For this reason algorithms taking this into account and recognizing both (a) the ratio of indicators (measures) to latent variables and (b) statistical power, are recommended in assessing adequacy of sample size (Westland, 2010).

The sample size of 166 is considered just adequate based on both the ratio of measures to latent variables (166 computed by the algorithm), and for an 80% statistical power level, and 0.05 probability level, with an medium effect size of 0.35 (127 computed by the algorithm). This is based on a calculation using a power calculator (Soper, 2013). The calculation is made using the algorithm and approach described by Westland (2010). The calculation is based on 4 construct variables and 13 measurement variables in a structural equation model as inputs. It should be noted that using traditional evaluation methods of number of observation to indicator, 65 observations would be the minimum sample size using a 5 to 1 observations to indicator approach.

5.3 Testing the Data and the Measurement Model

The data was analysed using a combination of SPSS and Lisrel 8.8. Exploratory factor analysis was conducted to validate the Brand indicators as these were self developed. General analysis of the data was undertaken to identify normality and consider demographic information. Confirmatory factor analysis was undertaken in relation to the measurement model.
5.3.1 Multivariate Normality

In relation to multivariate normality, the following statistics were generated using SPSS in relation to the measurement variables (split across Tables 23 and 24):

Table 23: Normality of Measurement Variables in the Pilot Study

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
<th>N</th>
<th>Mean</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Statistic</td>
<td>Statistic</td>
<td>Std. Error</td>
</tr>
<tr>
<td>PEOU1</td>
<td>166</td>
<td>5.1145</td>
<td>-.934</td>
<td>.188</td>
</tr>
<tr>
<td>PEOU2</td>
<td>166</td>
<td>4.7892</td>
<td>-.338</td>
<td>.188</td>
</tr>
<tr>
<td>PEOU3</td>
<td>166</td>
<td>5.0723</td>
<td>-.613</td>
<td>.188</td>
</tr>
<tr>
<td>PU1</td>
<td>166</td>
<td>4.9880</td>
<td>-.385</td>
<td>.188</td>
</tr>
<tr>
<td>PU2</td>
<td>166</td>
<td>5.1084</td>
<td>-.268</td>
<td>.188</td>
</tr>
<tr>
<td>PU3</td>
<td>166</td>
<td>4.9578</td>
<td>-.363</td>
<td>.188</td>
</tr>
<tr>
<td>Valid N (list wise)</td>
<td>166</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 24: Normality of Measurement Variables in the Pilot Study

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
<th>N</th>
<th>Mean</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Statistic</td>
<td>Statistic</td>
<td>Std. Error</td>
</tr>
<tr>
<td>IU1</td>
<td>166</td>
<td>5.6867</td>
<td>-.975</td>
<td>.188</td>
</tr>
<tr>
<td>IU2</td>
<td>166</td>
<td>5.7651</td>
<td>-1.222</td>
<td>.188</td>
</tr>
<tr>
<td>IU3</td>
<td>166</td>
<td>5.4337</td>
<td>-.815</td>
<td>.188</td>
</tr>
<tr>
<td>BRDRLY1</td>
<td>166</td>
<td>6.2530</td>
<td>-1.363</td>
<td>.188</td>
</tr>
<tr>
<td>BRDRLY2</td>
<td>166</td>
<td>5.9458</td>
<td>-.659</td>
<td>.188</td>
</tr>
<tr>
<td>BRDSTR1</td>
<td>166</td>
<td>6.2831</td>
<td>-2.423</td>
<td>.188</td>
</tr>
<tr>
<td>BRDSTR2</td>
<td>166</td>
<td>6.0964</td>
<td>-1.601</td>
<td>.188</td>
</tr>
<tr>
<td>Valid N (list wise)</td>
<td>166</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
As can be seen above, it is clear that multivariate normality does not hold given the levels of skewness and kurtosis. In general, the data is only moderately non-normal as skew < 2 and kurtosis < 7, with the exception of one measurement variable (BRDSTR1) (Finney & DiStefano, 2006). Even where data is severely non-normal and ordinal, use of Maximum Likelihood (a normal theory estimator) together with Satorra-Bentler scaling has been advocated for Structural Equation Modelling (Finney & DiStefano, 2006). This approach was undertaken using Lisrel software based on the above.

5.3.2 Exploratory Factor Analysis

Exploratory factor analysis was carried out using SPSS and is summarised below in Table 25. The results clearly support the presence of 4 factors corresponding to the four construct or latent variables, and support the correlation between the measurement variables. This gives comfort to the validity of the Brand measurement model at this stage. Exploratory factor analysis was conducted using maximum likelihood extraction, and oblique rotation (SPSS standard Oblimin with Kaiser Normalization).

Maximum likelihood extraction is recommended as a data extraction method when data is not severely non-normal as is the case here (Costello & Osborne, 2011). Oblique rotation is recommended (as opposed to orthogonal) since orthogonal rotations produce factors that are uncorrelated whereas oblique methods allow the factors to correlate (Costello & Osborne, 2011) – as is
theoretically expected in this model. There is no widely preferred method of oblique rotation and all tend to produce similar results (Fabrigar et al., 1999) so SPSS standard Oblimin with Kaiser Normalisation was used. Note in the results all cross loadings are less than 0.32, and all factor loading are greater than 0.5, indicating a good fit of individual measures to identified factors (Tabachnick et al., 2001).

Table 25: Exploratory Factor Analysis for Pilot Data

<table>
<thead>
<tr>
<th>Pattern Matrixa</th>
<th>Factor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>PEOU1</td>
<td></td>
<td>.130</td>
<td>.552</td>
<td>.069</td>
<td>.195</td>
</tr>
<tr>
<td>PEOU2</td>
<td></td>
<td>.016</td>
<td>.820</td>
<td>.006</td>
<td>-.090</td>
</tr>
<tr>
<td>PEOU3</td>
<td></td>
<td>.003</td>
<td>.943</td>
<td>-.010</td>
<td>.028</td>
</tr>
<tr>
<td>PU1</td>
<td></td>
<td>.814</td>
<td>-.026</td>
<td>.023</td>
<td>.094</td>
</tr>
<tr>
<td>PU2</td>
<td></td>
<td>.980</td>
<td>.016</td>
<td>.024</td>
<td>-.064</td>
</tr>
<tr>
<td>PU3</td>
<td></td>
<td>.698</td>
<td>.094</td>
<td>.042</td>
<td>.103</td>
</tr>
<tr>
<td>IU1</td>
<td></td>
<td>.060</td>
<td>.085</td>
<td>.030</td>
<td>.795</td>
</tr>
<tr>
<td>IU2</td>
<td></td>
<td>.092</td>
<td>-.083</td>
<td>.007</td>
<td>.836</td>
</tr>
<tr>
<td>IU3</td>
<td></td>
<td>.217</td>
<td>.228</td>
<td>.034</td>
<td>.476</td>
</tr>
<tr>
<td>BRDRLY1</td>
<td></td>
<td>-.097</td>
<td>.137</td>
<td>.662</td>
<td>.207</td>
</tr>
<tr>
<td>BRDRLY2</td>
<td></td>
<td>-.010</td>
<td>.098</td>
<td>.727</td>
<td>.119</td>
</tr>
<tr>
<td>BRDSTR1</td>
<td></td>
<td>.012</td>
<td>-.071</td>
<td>.746</td>
<td>-.019</td>
</tr>
<tr>
<td>BRDSTR2</td>
<td></td>
<td>.083</td>
<td>-.031</td>
<td>.712</td>
<td>-.143</td>
</tr>
</tbody>
</table>

Extraction Method: Maximum Likelihood.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 6 iterations.
5.3.3 Demographic analysis

Demographic and group information was obtained, however, the sample size was not considered large enough to conduct group analysis through structural equation modelling. Key demographic information on gender, age and industry showed no major variation in key summary statistics.

Table 26 below summarises the information. In general terms, the following characteristics were identified:

<table>
<thead>
<tr>
<th>Table 26: Pilot Study Demographic Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender – 75% male respondents, 25% female</td>
</tr>
<tr>
<td>Age – 50% below 45, 50% above 45 years of age</td>
</tr>
<tr>
<td>Industry – largest single group financial services 30%, rest small values</td>
</tr>
<tr>
<td>PwC as advisors – 50% used PwC for more than 5 years</td>
</tr>
<tr>
<td>Multinational – 54% of respondent organisations are multinational</td>
</tr>
</tbody>
</table>

5.3.4 Confirmatory Factor Analysis

The following shows the results from Lisrel 8 using Simplis of confirmatory factor analysis on the measurement variables. Each of the four is examined in turn in Tables 27 to 30.
Table 27: CFA Pilot Data – Perceived Usefulness

<table>
<thead>
<tr>
<th>PU1 = 1.22*PU, Errorvar.= 0.47  R² = 0.76</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.20)</td>
</tr>
<tr>
<td>t=2.41</td>
</tr>
<tr>
<td>PU2 = 1.13*PU, Errorvar.= 0.69  R² = 0.65</td>
</tr>
<tr>
<td>(0.17)</td>
</tr>
<tr>
<td>t=6.50</td>
</tr>
<tr>
<td>PU3 = 2.57*PU, Errorvar.= 2.08  R² = 0.76</td>
</tr>
<tr>
<td>(0.13)</td>
</tr>
<tr>
<td>t=20.17</td>
</tr>
</tbody>
</table>

The above shows t-values greater than 2 (statistically significant to 0.05 level) for the measurement variables and strong R² values (greater than 0.5) implying the measurement model for the latent variable is sound (Diamantopoulos & Siguaw, 2000)

Table 28: CFA Pilot Data – Intention to Use

<table>
<thead>
<tr>
<th>IU1 = 2.16*IU, Errorvar.= 2.41  R² = 0.66</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.24)</td>
</tr>
<tr>
<td>t=8.95</td>
</tr>
<tr>
<td>IU2 = 0.92*IU, Errorvar.= 0.55  R² = 0.60</td>
</tr>
<tr>
<td>(0.098)</td>
</tr>
<tr>
<td>t=9.42</td>
</tr>
<tr>
<td>IU3 = 1.32*IU, Errorvar.= 0.77  R² = 0.69</td>
</tr>
<tr>
<td>(0.29)</td>
</tr>
<tr>
<td>t=2.65</td>
</tr>
</tbody>
</table>

The above shows t-values greater than 2 (statistically significant to .05 level) for the measurement variables and strong R² values (greater than 0.5) implying
the measurement model for the latent variable is sound (Diamantopoulos & Siguaw, 2000).

Table 29: CFA Pilot Data – Perceived Ease of Use

<table>
<thead>
<tr>
<th>PEOU1 = 0.92*PEOU, Errorvar. = 0.37</th>
<th>R² = 0.69</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.043)</td>
<td>t=21.45</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PEOU2 = 0.91*PEOU, Errorvar. = 0.76</th>
<th>R² = 0.52</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.089)</td>
<td>t=10.21</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PEOU3 = 1.05*PEOU, Errorvar. = 0.28</th>
<th>R² = 0.80</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.053)</td>
<td>t=19.78</td>
</tr>
</tbody>
</table>

The above shows t-values greater than 3 (statistically significant to .01 level) for the measurement variables and strong R² values (greater than 0.5) implying the measurement model for the latent variable is sound (Diamantopoulos & Siguaw, 2000)

Table 30: CFA Pilot Data – Brand

<table>
<thead>
<tr>
<th>BRDRLY1 = 1.56*BRAND, Errorvar. = 2.32</th>
<th>R² = 0.51</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.18)</td>
<td>t=8.91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BRDRLY2 = 3.18*BRAND, Errorvar. = 5.27</th>
<th>R² = 0.66</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.25)</td>
<td>t=12.77</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BRDSTR1 = 2.02*BRAND, Errorvar. = 1.73</th>
<th>R² = 0.70</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.14)</td>
<td>t=14.56</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BRDSTR2 = 4.33*BRAND, Errorvar. = 12.68</th>
<th>R² = 0.60</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.31)</td>
<td>t=14.19</td>
</tr>
</tbody>
</table>
The above shows t-values greater than 3 (statistically significant to .01 level) for the measurement variables and strong $R^2$ values (greater than 0.5) implying the measurement model for the latent variable is sound (Diamantopoulos & Siguaw, 2000).

An alternative view of the data above showing standardised factor loadings is shown below in Figure 24.

Figure 24: Standardised Factor Loadings Pilot Model

Factor loadings of 0.5 or larger are considered as significant (Hair et al., 2010). In this case, all factor loadings exceed 0.7.

5.4 Construct Validity

As outlined in Chapter 4, construct validity of the measurement model concerns the extent to which the observed variables correctly reflect the latent
variable they are meant to represent. Two dimensions of construct validity, composite reliability and discriminant validity, are examined below.

5.4.1 Individual and Composite Reliability

Individual measure reliability was examined by reference to each measure’s Cronbach’s alpha, calculated using SPSS as follows. The Cronbach’s alpha coefficient is a measure of internal consistency, and increases as intercorrelation between measures of a latent variable increase. As a minimum, a value of greater than 0.6 is required (Garson, 2010), although 0.7 is often quoted as a lowest limit (Hair et al., 2010). The Alpha’s are set out in Tables 31 to 34 below.

Table 31: Cronbach's alpha for PEOU

<table>
<thead>
<tr>
<th>Reliability Statistics</th>
<th>Cronbach's Alpha</th>
<th>Cronbach's Alpha Based on Standardised Items</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.863</td>
<td>.865</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 32: Cronbach's alpha for PU

<table>
<thead>
<tr>
<th>Reliability Statistics</th>
<th>Cronbach's Alpha</th>
<th>Cronbach's Alpha Based on Standardised Items</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.910</td>
<td>.910</td>
<td>3</td>
</tr>
</tbody>
</table>
Table 33: Cronbach's alpha for IU

<table>
<thead>
<tr>
<th>Cronbach's Alpha</th>
<th>Cronbach's Alpha Based on Standardised Items</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>.867</td>
<td>.869</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 34: Cronbach's alpha for BRAND

<table>
<thead>
<tr>
<th>Cronbach's Alpha</th>
<th>Cronbach's Alpha Based on Standardised Items</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>.815</td>
<td>.821</td>
<td>4</td>
</tr>
</tbody>
</table>

As stated above, a minimum a value of greater than 0.6 is required (Garson, 2010), although 0.7 is often quoted as a lowest limit (Hair et al., 2010). In the above case all alpha’s exceed 0.8 indicating reliability of each measure.

Composite Reliability was calculated from first principles using the formula

\[
\text{Composite Reliability (CR)} = \frac{\left(\sum_{i=1}^{n} \lambda_i\right)^2}{\left(\sum_{i=1}^{n} \lambda_i\right)^2 + \left(\sum_{i=1}^{n} e_i\right)}
\]

where \(\lambda_i\) denotes the standardised factor loading for item \(i\) and \(e_i\) is the error variance term. The Composite Reliability values are in Table 35 below.
The composite reliability scores all significantly exceed 0.7 and support composite reliability (Gerbing & Anderson, 1988).

5.4.2 Discriminant Validity

If there is discriminant validity between two constructs, their AVE (Average Variance Extracted) should be higher than the squared correlation estimate between the two constructs (Hair et al., 2010). AVE is calculated for each construct as:

\[
\text{AVE} = \frac{\sum_{i=1}^{n} \lambda_i^2}{\sum_{i=1}^{n} \lambda_i^2 + \sum_{i=1}^{n} e_i}
\]

where \(\lambda_i\) denotes the standardised factor loading for item \(i\) and \(e_i\) is the error variance term. AVE was calculated for each construct as shown in Table 36 below.
Table 36: AVE for Pilot Study constructs

<table>
<thead>
<tr>
<th>CONSTRUCT</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEOU</td>
<td>0.67</td>
</tr>
<tr>
<td>PU</td>
<td>0.72</td>
</tr>
<tr>
<td>BRAND</td>
<td>0.61</td>
</tr>
<tr>
<td>IU</td>
<td>0.78</td>
</tr>
</tbody>
</table>

In each case the AVE is significantly greater than 0.5 indicating convergent validity (Diamantopoulos & Siguaw, 2006). The squared correlation between constructs are calculated and shown, and AVE values are reported as bold on the diagonal, in Table 37 below:

Table 37: AVE and Squared Correlations
Pilot Study

<table>
<thead>
<tr>
<th></th>
<th>IU</th>
<th>PU</th>
<th>PEOU</th>
<th>BRAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>0.78</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PU</td>
<td>0.43</td>
<td>0.72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEOU</td>
<td>0.44</td>
<td>0.29</td>
<td>0.67</td>
<td></td>
</tr>
<tr>
<td>BRAND</td>
<td>0.07</td>
<td>0.11</td>
<td>0.14</td>
<td>0.61</td>
</tr>
</tbody>
</table>
It can be seen that in all cases, the relevant AVE scores are higher than the squared correlations for each pair of variables. The scores for IU with PU (.43) and PEOU (.44) show high correlation is estimated between these variables. However, this high correlation is consistent with the model being tested which, based on the Technology Acceptance Model theory, expects very strong correlation between these variables. It is felt that discriminant validity is maintained based on the above results.

5.5 Model Fit and Model Modification

The initial structural equation model in Lisrel is shown below in Figure 25.

Figure 25: Basic Structural Model – Pilot Study

An initial run of Lisrel utilising Maximum Likelihood and Satorra-Bentler scaling gave the following results for the measurement of Intention to Use and Perceived Usefulness summarised in Tables 38 and 39.
Table 38: Pilot Study Structural Equation for IU

<table>
<thead>
<tr>
<th>IU = 0.57<em>PU+0.069</em>PEOU+0.032*BRAND, Errorvar.=0.11</th>
<th>R²= 0.69</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.11)</td>
<td>(0.073)</td>
</tr>
<tr>
<td>(0.047)</td>
<td>(0.028)</td>
</tr>
<tr>
<td>t=5.30</td>
<td>t=0.95</td>
</tr>
<tr>
<td>t=0.68</td>
<td>t=3.81</td>
</tr>
</tbody>
</table>

The t-values for the relationship between IU and PEOU and IU and BRAND were not statistically significant at .95 and .68 respectively.

Table 39: Pilot Study Structural Equation for PU

<table>
<thead>
<tr>
<th>PU = 0.49<em>PEOU + 0.081</em>BRAND, Errorvar.= 0.23</th>
<th>R² = 0.55</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.064)</td>
<td>(0.075)</td>
</tr>
<tr>
<td>(0.054)</td>
<td></td>
</tr>
<tr>
<td>t=7.56</td>
<td>t=1.08</td>
</tr>
<tr>
<td>t=4.33</td>
<td></td>
</tr>
</tbody>
</table>

The t-value for the relationship between PU and BRAND was not statistically significant at 1.08.

Overall indicators for model fit were strong. The Satorra-Bentler Chi squared was 94.09 with 59 degrees of freedom, the comparative fit index (CFI) score was strong at 0.99, and the Standardised Root Mean Square Residual (SRMR) reasonable at .068. The combination of CFI and SRMR at these values is a strong indicator of good fit under cut off criteria set out by Hu and Bentler (1999).

Given the poor results in relation to the BRAND variable relationship, a revised structural model excluding BRAND was tested. This may well be due
to the fact that PwC’s brand strength and perceived reliability is not significantly different to that of its main competitors in this space. This lack of differentiation between potential providers of similar information services could explain the lack of relationship between BRAND and other latent variables.

Exclusion of BRAND has little impact on exploration of the original research question being analysed and introduced in Chapter 3, since BRAND has no role in the Technology Acceptance Model under consideration:

*Does the technology acceptance model appear to be supported in the context of tax technology?*

The revised model is illustrated below in Figure 26.

Figure 26: Revised Basic Structural Model – Pilot Study
Essentially, the revised model dropped the BRAND variable from the original model. The results from modelling in Lisrel using SIMPLIS and maximum likelihood Structural Equation Modelling are set out below in Tables 40 and 41.

Table 40: Revised Pilot Study Structural Equation Model IU

<table>
<thead>
<tr>
<th>IU = 0.70<em>PU + 0.23</em>PEOU</th>
<th>Errorvar. = 0.23</th>
<th>R² = 0.77</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(0.13)</td>
<td>(0.085)</td>
</tr>
<tr>
<td></td>
<td>t=5.38</td>
<td>t=2.72</td>
</tr>
<tr>
<td></td>
<td>(0.12)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>t=1.88</td>
<td></td>
</tr>
</tbody>
</table>

The above shows t-values greater than 3 (statistically significant to .01 level) for the relationship between IU and PU and the error variance, and strong R² value (greater than 0.5) implying the structural model for the relationship is sound (Diamantopoulos & Siguaw, 2000). The relationship between IU and PEOU is just short of statistical significance at 1.88 and is questionable at the .05 level of significance.

Table 41: Revised Pilot Study Structural Equation Model PU

<table>
<thead>
<tr>
<th>PU = 0.74*PEOU</th>
<th>Errorvar. = 0.46</th>
<th>R² = 0.54</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(0.063)</td>
<td>(0.11)</td>
</tr>
<tr>
<td></td>
<td>t=11.80</td>
<td>t=4.19</td>
</tr>
</tbody>
</table>

The above shows t-values greater than 3 (statistically significant to .01 level) for the measurement variables and strong R² value (greater than 0.5) implying...
the relationship between PU and PEOU is sound (Diamantopoulos & Siguaw, 2000).

Overall indicators for model fit were strong. The Satorra-Bentler Chi squared was 33.04 with 24 degrees of freedom, the comparative fit index (CFI) score was very strong at 1, and the Standardised Root Mean Square Residual (SRMR) very strong at .046. The combination of CFI and SRMR at these values is a strong indicator of strong fit under cut off criteria set out by Hu and Bentler (1999). Figure 27 showing the revised structural model in standard form is set out below.

Figure 27: Revised Standard Form Structural Model – Pilot Study
5.6 Conclusions on Pilot Study

The pilot study failed to provide adequate support for the self-developed BRAND latent variable having statistically significant influence on the model of technology acceptance in this context. The revised model, however, did provide strong statistical support for the traditional Technology Acceptance Model in the context of technology acceptance in relation to tax technology. It should be noted, however, there was only weak support for the direct relationship between PEOU and IU. This is in line with other previous studies – see for example the study described by Gefen et al. (2000), that of Subramanian (1994) and the findings of King and He (2006).

The results of the Pilot Study provide support for a positive answer to the first research question:

*Does the technology acceptance model appear to be supported in the context of tax technology?*

Based on the empirical data gathered, in the context of intention to use web based tax technology, the technology acceptance model does appear to be supported.

The pilot study allowed experience of some of the challenges associated with collecting empirical data to be obtained, including consideration of sampling approaches and questionnaire design. In addition, exposure to data analysis
techniques and structural equation methodologies together with exposure to techniques for analysing results provided an excellent grounding for the main study empirical work to follow. It was clear that careful selection of latent variables was necessary to develop an empirically verifiable structural model, and that data collection could be challenging.
6. CHAPTER 6: DATA COLLECTION APPROACH AND MODEL MODIFICATION

6.1 Introduction

This chapter is concerned with the approach taken to gathering the empirical data in order to test and validate the identified structural equation and measurement model. The unit of analysis and informants are identified, and then the survey method and procedure initially envisaged for data gathering are discussed. In particular, the framing of the Qualtrics-based data collection questionnaire is discussed. Significant problems arose in relation to the initial sampling approach, so the amended sampling approach undertaken to overcome these problems is then described.

It is important that a structural model is not overcomplicated and does not become impossible to analyse with sufficient empirical data and sufficient statistical power to be statistically valid. If the model contains too many constructs and variables it may be adversely affected by random error or noise in the data unless significant volumes of empirical data can be obtained to retain a sample size sufficient to identify all parameters and retain statistical power in the model (Schumacker & Lomax, 2004).

A continued challenge faced was the small number of available respondents during the course of data collection. For this reason, the specific minimum sample size was identified for adequate statistical power in order to ensure that
sufficient responses were collected. The implications of a small sample size on statistical power and on fit indices is examined. As a result of the implications of small sample size, a more parsimonious structural equation model was derived with fewer latent variables. The process of how this revised model was derived is discussed.

6.2 Survey Method and Procedure

The unit of analysis and informants are first discussed. Next, the framing of the questionnaire is outlined. Finally, the initial planned approach to the data collection process and target sample size is discussed.

6.2.1 The unit of analysis and informants

The selection of an appropriate level of theory, appropriate level of measurement and appropriate level of analysis is critical when designing and discussing management and organisational studies (Klein et al., 1994). The level of theory describes the target that the researcher aims to explain. It is the level at which generalisation is intended to be made. The level of measurement describes the actual source of the data (for example the individuals responding to questions – the informants). The level of statistical analysis describes the treatment of the data during statistical procedures (Klein et al., 1994).

In this study, the unit of analysis is the buying decision process in relation to tax technology. This corresponds with the purpose of this study, which is to
explore the role of technology acceptance in the business buying of tax technology and related services. In more detail, the unit of analysis is the process of how a buyer in an organisation forms an intention to buy tax technology from a provider.

The informants or respondents, who represent the unit of measurement, are individuals within large businesses. HM Revenue and Customs (mirroring an EU definition) describe a large business as:

“A business having either >250 employees; or >€50M turnover and €43M assets. However, in practice, we also include UK businesses owned by multi-nationals having >100 employees in the UK and which otherwise satisfy the criteria for number of employees, turnover and assets, globally” (HMRC, 2013).

Identifying key informants is recommended to reduce response error and problems with perceptual agreement (Kumar et al., 1993). In more detail, these key informants are senior finance staff in the organisation with lead responsibility for taxation. For this reason, tax specialists in larger businesses, typically heads of tax or senior tax personnel were deemed most appropriate to complete the questionnaire described below. The questionnaire was created in Qualtrics Software as provided by Manchester Business School, with questions relating to all measures for all variables automatically randomised within one question block to minimise priming effects.
6.2.2 The framing of the questionnaire

As outlined, the unit of analysis is the process of how a buyer in an organisation forms an intention to buy tax technology from a provider. The respondents are heads of tax functions in large organisations. These individuals are typically very senior staff within the finance function of major multi-national organisations, but not typically Board members. They are typically extremely busy, working under pressurized conditions and with resource challenges.

The respondents were asked (in the first question in the questionnaire) to consider a tax technology offering from a single supplier (such as a tax software tool, web service or application) which they were currently evaluating or considering for use in their tax function. It was stressed that it was important that they responded in relation to a then current evaluation process. They were instructed that if not currently evaluating a tax technology offering (i.e. they had already made a decision), to answer no to the question (which terminated the questionnaire). The questionnaire is attached at Appendix B.

The introduction to the questionnaire mentioned that it related to a doctoral research project being conducted by the Manchester Business School. The respondents were informed that the study was for research purposes only, and
all the responses to questions are completely anonymous. It was made clear that all the information provided was absolutely confidential and would not be disclosed to anyone other than in aggregated and anonymised statistical form.

6.2.3 The initial sampling and data collection approach

An initial sample of up to 3,000 companies from both the UK and the US was originally envisaged, to be identified based on size of organisation corresponding to UK and US tax authority definitions of large businesses (see above). These were identified as likely to have in-house tax functions (or a local financial controller responsible for tax) and have at some point typically bought tax software.

A 20% target response rate would result in a sample size of between 300 and 600 responses, based on an initial assumption that up to half of the initial respondents would not actually be currently considering tax software purchases at the time of being surveyed, such that the true population size would be reduced. A sample size of this order should be sufficient to allow testing of the research model with structural equation techniques (Schumacker & Lomax, 2004).

The envisaged approach was to utilise PwC UK and US large company databases and mailing lists to identify the population. In this regard, it should
be noted that it is almost never the case that one accountancy firm is the sole source of taxation services and tax software, and a large number of companies who are not tax clients of PwC are still on the databases and mailing lists for marketing purposes. The link to the web based survey questionnaire and a personalized covering email would be sent to each head of taxation by email from a relevant PwC contact. Post-notification or follow up contact was to be used to ensure a strong response rate. The typical covering email used is attached at Appendix C.

It should be noted that there were no identifiable panel providers or research companies making available access to panel members with tax related job descriptions. Similarly there are no equivalent panel lists provided by any major tax association or membership body. This made access to a wide population of respondents very challenging, hence the initial planned approach was to leverage the researcher’s role as a partner in PwC to gain access to a wide list of respondents.

Unfortunately, difficulties emerged in relation to access to and use of internal databases and mailing lists. The US firm of PwC was unwilling to make available any mailing lists for these purposes due to concerns in relation to data protection and the complexity of gaining retrospective permission for contact data to be used for these purposes. There was also a concern in relation
to potential negative responses from organisations to unsolicited approaches of this type.

The UK firm had similar concerns and issues, however, it had agreed in principal to help the research process. This, however, was constrained to a single sample exercise on one mailing database of approximately 200 companies as test of client reaction, and no follow up was authorized if poor response rates resulted. Only strong responses and no complaints would lead to an ongoing approach of this type. Unfortunately, this exercise only resulted in less than a 5% response rate and no further organisational level support for data collection in this way was made available by the UK firm.

Some of the individuals who had not responded were prepared to explain (or had more casually mentioned) why they had not responded. The common issue, outlined to their PwC contacts and fed back, seemed to be that without follow up and a personalised request these types of survey would just ‘drop off the to do list or be forgotten’. This was mainly due to the fact that the targeted individuals were extremely busy, and if they did not immediately complete the questionnaire, it would be forgotten.

Unfortunately, the process of identifying the above problems, researching panel availability (or lack of availability), and negotiating access to the initial mailing list and getting surveys sent out took a very considerable period of
time but led to no useful respondent data. This aspect of the research project was a source of continued discussion with academic supervisors over a two year period. Eventually, an alternative sampling approach and strategy was devised as outlined below.

### 6.3 Amended Sampling Approach

Given the problems experienced in the initial sampling strategy, an alternative approach was designed. Under this approach, opportunities were first sought to identify small groups of tax directors attending general tax conferences run by third parties and request permission to approach those attendees to ask them to complete the data collection questionnaire. In this case, an incentive was offered by way of a draw entered by those completing the questionnaire, the winner of which would win an Amazon Kindle.

Ultimately, the organizers of two conferences were happy to allow this approach and data was collected from these events. A better than 90% response rate before exclusion of surveys answering ‘no’ to the question “are you currently considering a tax technology purchase.” was achieved, and an effective response rate (after exclusion) of over 50% was obtained.

Secondly, under this alternative approach, a series of small populations of tax directors were identified, and each small population was approached. These populations corresponded to contacts with whom fellow tax partners had a
relationship, and those individual tax partners were willing to speak to their
contacts to request their support in responding to the survey, and to carry out a
small degree of follow up with non-respondents. Again, a better than 80% response rate was achieved in the majority of cases, and better than 40% effective response rate achieved overall in all cases. This high response rate was clearly driven by personal requests and contact with respondents.

In each case, questionnaires with incomplete answers, or where the respondent was not actively considering technology were immediately excluded. Any obvious randomly completed surveys were also excluded. In general, the quality of completed responses and accuracy was very high. Only occasional coding transposition errors were noted (for example when a Strongly Disagree appeared to contradict many other related Strongly Agree answers and the question polarity had been reversed). In such cases, the responses were discarded and in limited scenarios remapped to the correct and clearly intended response.

A summary of the data collected is set out below in Table 42. Given the two conferences attended, as well as the use made of 13 personal contacts, a total of 125 useable responses was achieved, equating to a 42% response rate of these combined smaller populations.
<table>
<thead>
<tr>
<th>Sample</th>
<th>Number of individuals in population</th>
<th>Number of respondents before exclusions</th>
<th>Number of respondents actively considering technology and valid data</th>
<th>Key country location of respondents or region if specific country not known</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conference 1</td>
<td>39</td>
<td>34</td>
<td>22</td>
<td>UK</td>
</tr>
<tr>
<td>Conference 2</td>
<td>50</td>
<td>46</td>
<td>30</td>
<td>EU (multiple)</td>
</tr>
<tr>
<td>EV batch</td>
<td>12</td>
<td>10</td>
<td>4</td>
<td>Netherlands</td>
</tr>
<tr>
<td>GVIB batch</td>
<td>27</td>
<td>19</td>
<td>7</td>
<td>Global (multiple)</td>
</tr>
<tr>
<td>KN batch</td>
<td>25</td>
<td>22</td>
<td>8</td>
<td>UK</td>
</tr>
<tr>
<td>MM batch</td>
<td>10</td>
<td>7</td>
<td>2</td>
<td>Switzerland</td>
</tr>
<tr>
<td>PMW batch</td>
<td>9</td>
<td>8</td>
<td>3</td>
<td>UK</td>
</tr>
<tr>
<td>SB batch</td>
<td>12</td>
<td>10</td>
<td>5</td>
<td>UK</td>
</tr>
<tr>
<td>SK batch</td>
<td>14</td>
<td>12</td>
<td>6</td>
<td>UK</td>
</tr>
<tr>
<td>T batch</td>
<td>13</td>
<td>11</td>
<td>5</td>
<td>EU</td>
</tr>
<tr>
<td>US batch</td>
<td>18</td>
<td>15</td>
<td>6</td>
<td>US</td>
</tr>
<tr>
<td>AB batch</td>
<td>25</td>
<td>21</td>
<td>12</td>
<td>UK</td>
</tr>
<tr>
<td>AJ batch</td>
<td>13</td>
<td>10</td>
<td>5</td>
<td>UK</td>
</tr>
<tr>
<td>AW batch</td>
<td>19</td>
<td>15</td>
<td>7</td>
<td>UK</td>
</tr>
<tr>
<td>AM Batch</td>
<td>9</td>
<td>6</td>
<td>3</td>
<td>UK</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>295</strong></td>
<td><strong>246</strong></td>
<td><strong>125</strong></td>
<td></td>
</tr>
<tr>
<td>Response rate (# / population)</td>
<td></td>
<td></td>
<td><strong>83%</strong></td>
<td><strong>42%</strong></td>
</tr>
</tbody>
</table>
6.4 Sample Size and Statistical Power

The potentially low number of responses was a matter for concern during the data collection process. Generally, for Structural Equation Modelling, a minimum acceptable size of between 100 and 150 respondents appears to be required (Anderson & Gerbing, 1988). Many traditional sources quote minimum sample sizes based on a linear calculation such as minimum number of respondents or observations being equal to 5 multiplied by the number of measures – for example Gorsuch (1983). Others frequently cite 10 observations per indicator in setting a lower bound for the adequacy of sample sizes (Westland, 2010).

It is clear that however that minimum sample size does not have linear relationship with the number of measurement variables. Complexities which increase information demands (degrees of freedom) in structural model estimation increase in line with the number of potential combinations of latent variables. The information supplied for estimation to meet those demands increases with the number of measured parameters times the number of observations in the sample size. Both are non-linear (Westland, 2010). The sample size required is reduced as the number of measures per latent variable increases (again in a non-linear fashion) (Marsh et al., 1998)
There is also a risk that a research model is overcomplicated and becomes impossible to analyse with sufficient empirical data and sufficient statistical power to be statistically valid. If a model contains too many constructs and variables it may be adversely affected by random error or noise in the data unless significant volumes of empirical data can be obtained to retain a sample size sufficient to identify all parameters and retain statistical power in the statistical model (Schumacker & Lomax, 2004). Ideally a statistical power based approach should be taken, with a sample size reached that ensures the statistical power exceeds the traditional 0.8 level (Schumacker & Lomax, 2004).

A calculation was made using the algorithm and approach described by Westland (2010) to determine the minimum sample size needed based on both (a) the ratio of measures to latent variables, and (b) an 80% statistical power level, and 0.05 probability level, with an medium effect size of 0.35 given the original structural model. The actual calculation was made using a power calculator based on that algorithm and made available via the Westland (2010) article on the sciencedirect website at:


In the original structural model described above, there are 11 latent variables and 39 measures or indicator variables. The algorithm computes a minimum
sample size of 133 for the ratio of measures to latent variables on this basis, and a minimum sample size of 125 for statistical power.

The sample size required based on the original model appeared larger than the available data set, and the complexity of the structural model was already a concern due to the large number of variables and constructs. For this reason a reduced number of variables and more parsimonious model was considered and is described below. For the revised model, which consisted of 9 latent variables and 33 indicator variables, the Westland (2010) algorithm computes a minimum sample size of 122 respondents for the ratio of measures to latent variables, and 118 respondents based on statistical power. The actual sample size of 125 exceeds this.

It should be noted that traditional methods of evaluating sample size on a linear basis would expect a minimum sample size of 165 respondents (five times the number of measures or indicator variables, as outlined above). On this basis sample size might still be challenged.

6.5 Revised Structural Equation Model

The original structural equation model was reviewed to identify opportunities to reduce the number of latent variables and hence the complexity of the original structural model, with minimum impact on its explanatory power. It was identified that two latent variables, being perceived service quality and
perceived risk would appear to be least critical in examining the research questions outlined above. Removal of those latent variables had the impact of reducing the number of latent variables to 9, and the number of indicator variables to 33 as outlined above.

The removal of Perceived Risk and Perceived Service Quality appears to be justifiable in the specific circumstances under consideration. Neither of these constructs is key to the research questions under evaluation. Their removal has minimum impact on the research hypotheses under consideration. Typically, there is little differentiation between major accounting firms and tax technology providers on the basis of perceived risk. However, there is differentiation based on product quality and price. Removal of those variables relating to product quality and price would fundamentally impact on the research model.

In the Sweeney et al. study (1999), Perceived Service Quality had limited impact on Perceived Value for Money, so removing it may be supportable based on this. However Perceived Risk did have a significant relationship with Perceived Value for Money. Removal of this construct will therefore impact on the explanatory power of the model potentially.
The impact on the research hypotheses is summarised below – the impacted hypotheses are identified via strikethrough:

H1a: Perceived Ease of Use is positively related to Perceived Usefulness

H1b: Perceived Ease of Use is positively related to Attitude to Use

H2a: Perceived Usefulness is positively related to Attitude to Use

H2b: Perceived Usefulness is positively related to Intention to Use

H3: Subjective Norm is positively related to Intention to Buy

H4: Perceived Behavioural Control is negatively related to Intention to Buy

H5: Attitude to Use is positively related to Perceived Value for Money

H6: Perceived Service Quality is positively related to Perceived Value for Money

H7: Perceived Risk is negatively related to Perceived Value for Money

H8: Perceived Relative Price is negatively related to Perceived Value for Money

H9a: Relationship Quality is negatively related to Perceived Risk

H9b: Relationship Quality is positively related to Intention to Buy

H10: Perceived Value for Money is positively related to Intention to Buy

The resultant structural model is outlined below in Figure 28.
Figure 28: Revised Structural Model
6.6 Conclusion

The unit of analysis was established as the business buying decision process in relation to tax technology software. The informants were identified as senior finance staff in the buying organisation with lead responsibility for taxation, being typically heads of tax or senior tax personnel. The initial survey method and procedure envisaged for data gathering proved unsuccessful, so an amended sampling approach was undertaken to overcome the problems actually encountered. The revised approach involved breaking down the approach into targeting discrete populations of heads of tax and using direct personal appeals to help improve the response rates dramatically.

Despite the above, a relatively small number of usable responses were obtained. In relation to what was a complex theoretical model with a large number of latent variables, there was a concern that the model was overly complex and had too few respondents to have adequate statistical power. For this reason, a revised structural model with two less latent variables was identified. Analysis of this model using an algorithm developed by Westland (2010) confirmed that an adequate sample size had been reached as the actual sample size just exceeded the minimum required sample size for 0.80 statistical power at 0.05 significance. It is recognised however that the small sample size could be challenged based on traditional methods of identifying adequate sample size.
7. CHAPTER 7: DATA ANALYSIS – MEASUREMENT MODEL

7.1 Introduction

In this Chapter, the data and the measurement model are reviewed. Firstly, the demographic and group data is examined, and then the distribution and multivariate normality of the data is considered. Then exploratory and confirmatory factor analysis are reviewed. Finally, the validity and reliability of the measurements is examined.

7.2 Demographic Analysis

Demographic and group information was obtained, however, sample size was not considered large enough to conduct any group analysis through structural equation modelling. Key demographic information is outlined below in Tables 43 to 48 (and broad geographic information is described in Table 42 above).

7.2.1 Analysis of responses by technology type

Different types of technology could result in different levels of importance or influence of key variables in the model. In a meta-study in relation to the Technology Acceptance Model, Schepers and Wetzels (2007) showed that significant differences in pairwise correlations could result from examination of different technology types.
The above spread of responses appears reasonably representative of the spread of tax technology types in the marketplace based on practical experience, and the sample data appears representative.

### 7.2.2 Analysis of responses by gender

The distribution of respondents is representative of the relative numbers of male and female heads of tax in the wider population based on my experience.

There are significantly more male than female heads of tax in general terms.

Differences in gender could result in differences in perceptions in relation to technology and impact the overall model. Gefen & Straub (1997) showed in a study on the impact of gender on technology acceptance that different genders had statistically significantly different perceptions of ease of use and usefulness.
Table 44: Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number of respondents</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>84</td>
<td>67%</td>
</tr>
<tr>
<td>Female</td>
<td>41</td>
<td>33%</td>
</tr>
</tbody>
</table>

### 7.2.3 Analysis of responses by age

The majority of the sample fall within the age range of 30 to 50, which is representative of the population of heads of tax in my experience. A study relating to Theory of Planned Behaviour by Morris and Venkatesh (2000) showed that as age increased, the relative importance of attitude in determining intention decreased, but the importance of subjective norm and perceived behavioural control increased. This illustrates why age could be a useful variable for analysis.

Table 45: Age of Respondents

<table>
<thead>
<tr>
<th>Age</th>
<th>Number of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 30</td>
<td>3</td>
</tr>
<tr>
<td>30 to under 40</td>
<td>39</td>
</tr>
<tr>
<td>40 to under 50</td>
<td>57</td>
</tr>
<tr>
<td>50 or over</td>
<td>26</td>
</tr>
</tbody>
</table>
7.2.4 Analysis of responses by size of tax function

The data below shows that this sample is drawn from organisations with relatively large tax functions, but is consistent with the size of the organisations as described at 7.2.6 below in my experience. Typically, in any one country the size of the tax function is less than 20 people even for the largest organisations, which, of course, have a larger global headcount overall.

Table 46: Size of Tax Function

<table>
<thead>
<tr>
<th>How large is your tax function globally in full time equivalent headcount?</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 10</td>
<td>34</td>
</tr>
<tr>
<td>10 to less than 30</td>
<td>42</td>
</tr>
<tr>
<td>30 to less than 50</td>
<td>19</td>
</tr>
<tr>
<td>50 or more</td>
<td>30</td>
</tr>
</tbody>
</table>

7.2.5 Analysis of responses by industry

The sample clearly is drawn from a wide and representative range of industries when compared to the wider population. On this basis, it is unlikely that bias is introduced by virtue of a distinct industry context.
Table 47: Industry

<table>
<thead>
<tr>
<th>What industry best describes your organisation from the choices below?</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial Services</td>
<td>22</td>
</tr>
<tr>
<td>Consumer Products and Retail</td>
<td>16</td>
</tr>
<tr>
<td>Industrial or manufacturing</td>
<td>19</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>7</td>
</tr>
<tr>
<td>Entertainment and Media</td>
<td>10</td>
</tr>
<tr>
<td>Legal &amp; Professional Services</td>
<td>9</td>
</tr>
<tr>
<td>Pharmaceuticals or Chemicals</td>
<td>12</td>
</tr>
<tr>
<td>Public Sector</td>
<td>1</td>
</tr>
<tr>
<td>Hospitality or Business Services</td>
<td>2</td>
</tr>
<tr>
<td>Other (various)</td>
<td>27</td>
</tr>
</tbody>
</table>

7.2.6 Analysis of responses by turnover

As outlined at 7.2.4 above, the sample is clearly drawn from large to very large companies. For this reason, application of any results from this study to small or medium sized enterprises without further empirical study should be approached with caution.

Table 48: Turnover

<table>
<thead>
<tr>
<th>How large is your organisation globally as measured by turnover?</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than £100m</td>
<td>3</td>
</tr>
<tr>
<td>£100m to less than £500m</td>
<td>4</td>
</tr>
<tr>
<td>£500m to less than £1bn</td>
<td>16</td>
</tr>
<tr>
<td>£1bn to less than £5bn</td>
<td>48</td>
</tr>
<tr>
<td>£5bn or more</td>
<td>54</td>
</tr>
</tbody>
</table>
7.2.7 Analysis of responses by procurement involvement

Only 30% of respondents reported involvement of their procurement function in the tax technology buying decision process. This supports the expected situation based on the researcher's industry experience that in relation to tax technology procurement has limited involvement, and is frequently not involved at all.

In relation to the literature, this lends support to looking at an analysis derived from B2C models rather than traditional models of B2B marketing. This is because the lack of procurement involvement together with the typical single lead tax decision maker, implies that it is less likely that decisions are being made in a highly structured group based process and more likely there is an autonomous decision maker (Sheth, 1973, p. 54).

7.3 Examining the data for Multivariate Normality

In relation to multivariate normality, the following statistics were generated using SPSS in relation to the measurement variables. Statistics for Skewness and Kurtosis in relation to each variable were generated for this purpose. The results are shown below in Table 49.
Table 49: Normality statistics for main study

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
<th>N</th>
<th>Mean</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>Std. Error</th>
<th>Statistic</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVM1_1</td>
<td>125</td>
<td>5.05</td>
<td>-0.685</td>
<td>0.217</td>
<td>0.027</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>PVM2_1</td>
<td>125</td>
<td>5.20</td>
<td>-0.827</td>
<td>0.217</td>
<td>0.383</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>PVM3_1</td>
<td>125</td>
<td>4.98</td>
<td>-0.285</td>
<td>0.217</td>
<td>-0.363</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>PRP1_1</td>
<td>125</td>
<td>4.35</td>
<td>0.273</td>
<td>0.217</td>
<td>0.383</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>PRP2_1</td>
<td>125</td>
<td>4.19</td>
<td>0.842</td>
<td>0.217</td>
<td>0.501</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>PRP3_1</td>
<td>125</td>
<td>4.72</td>
<td>-0.051</td>
<td>0.217</td>
<td>-0.852</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>ITB1_1</td>
<td>125</td>
<td>5.30</td>
<td>-1.053</td>
<td>0.217</td>
<td>0.619</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>ITB2_1</td>
<td>125</td>
<td>5.05</td>
<td>-1.010</td>
<td>0.217</td>
<td>0.702</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>ITB3_1</td>
<td>125</td>
<td>5.11</td>
<td>-1.010</td>
<td>0.217</td>
<td>0.455</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>RQ1_1</td>
<td>125</td>
<td>5.32</td>
<td>-0.814</td>
<td>0.217</td>
<td>1.980</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>RQ2_1</td>
<td>125</td>
<td>5.66</td>
<td>-1.359</td>
<td>0.217</td>
<td>4.810</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>RQ3_1</td>
<td>125</td>
<td>5.80</td>
<td>-1.319</td>
<td>0.217</td>
<td>4.976</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>RQ4_1</td>
<td>125</td>
<td>5.94</td>
<td>-1.388</td>
<td>0.217</td>
<td>3.863</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>RQ5_1</td>
<td>125</td>
<td>5.24</td>
<td>-0.313</td>
<td>0.217</td>
<td>-0.360</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>RQ6_1</td>
<td>125</td>
<td>5.29</td>
<td>-0.640</td>
<td>0.217</td>
<td>0.887</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>RQ7_1</td>
<td>125</td>
<td>5.34</td>
<td>-0.511</td>
<td>0.217</td>
<td>0.991</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>PEOU1_1</td>
<td>125</td>
<td>5.25</td>
<td>-1.137</td>
<td>0.217</td>
<td>0.726</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>PEOU2_1</td>
<td>125</td>
<td>4.94</td>
<td>-1.002</td>
<td>0.217</td>
<td>0.634</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>PEOU3_1</td>
<td>125</td>
<td>5.09</td>
<td>-0.995</td>
<td>0.217</td>
<td>0.237</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>PU1_1</td>
<td>125</td>
<td>5.86</td>
<td>-1.915</td>
<td>0.217</td>
<td>5.263</td>
<td>.430</td>
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</tr>
<tr>
<td>PU2_1</td>
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<td>5.96</td>
<td>-1.774</td>
<td>0.217</td>
<td>5.134</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>PU3_1</td>
<td>125</td>
<td>5.94</td>
<td>-1.824</td>
<td>0.217</td>
<td>4.858</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>ATU1_1</td>
<td>125</td>
<td>5.90</td>
<td>-1.951</td>
<td>0.217</td>
<td>4.773</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>ATU2_1</td>
<td>125</td>
<td>5.76</td>
<td>-2.244</td>
<td>0.217</td>
<td>6.135</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>ATU3_1</td>
<td>125</td>
<td>5.81</td>
<td>-1.971</td>
<td>0.217</td>
<td>4.999</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>ATU4_1</td>
<td>125</td>
<td>5.88</td>
<td>-2.400</td>
<td>0.217</td>
<td>7.006</td>
<td>.430</td>
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</tr>
<tr>
<td>ATU5_1</td>
<td>125</td>
<td>5.77</td>
<td>-2.188</td>
<td>0.217</td>
<td>5.837</td>
<td>.430</td>
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<td>SN1_1</td>
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<td>5.05</td>
<td>-0.871</td>
<td>0.217</td>
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<td>-0.958</td>
<td>0.217</td>
<td>0.738</td>
<td>.430</td>
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<tr>
<td>SN3_1</td>
<td>125</td>
<td>5.34</td>
<td>-1.196</td>
<td>0.217</td>
<td>0.967</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>PBC1_1</td>
<td>125</td>
<td>5.55</td>
<td>-1.194</td>
<td>0.217</td>
<td>2.659</td>
<td>.430</td>
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</tr>
<tr>
<td>PBC2_1</td>
<td>125</td>
<td>5.50</td>
<td>-1.218</td>
<td>0.217</td>
<td>2.420</td>
<td>.430</td>
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</tr>
<tr>
<td>PBC3_1</td>
<td>125</td>
<td>5.59</td>
<td>-1.307</td>
<td>0.217</td>
<td>2.406</td>
<td>.430</td>
<td></td>
</tr>
<tr>
<td>Valid N (list wise)</td>
<td>125</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
It is clear that multivariate normality does not hold given the levels of skewness and kurtosis shown in Table 49 above. In general the data is only moderately non-normal as skew < 2 and kurtosis < 7 with the exception of three measurement variables related to Attitude to Use as highlighted above in Table 49. (Finney & DiStefano, 2006).

Even where data is severely non-normal (skew >2 and kurtosis >7) and ordinal, use of Maximum Likelihood (a normal theory estimator) together with Satorra-Bentler scaling has been advocated for Structural Equation Modelling (Finney & DiStefano, 2006). For this reason all measurement variables are retained, including the three severely non-normal Attitude to Use measures, and Maximum Likelihood with Satorra-Bentler scaling Structural Equation Modelling utilised. This approach was undertaken using Lisrel software based on the above.

### 7.4 Exploratory and Confirmatory Factor Analysis

Exploratory factor analysis and confirmatory factor analysis were carried out as an initial examination of the measurement model.

#### 7.4.1 Exploratory Factor Analysis

Exploratory factor analysis was carried out using SPSS and is summarised in Table 50 below. Exploratory factor analysis was conducted using maximum likelihood extraction, and oblique rotation (SPSS standard Oblimin with
Kaiser Normalization). This approach was selected for the reasons outlined in Chapter 5 above for the pilot study. The results are shown below:

Table 50: EFA Main Study

<table>
<thead>
<tr>
<th>Factor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVM1_1</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>0.83</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVM2_1</td>
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<td></td>
<td></td>
<td>0.87</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>PVM3_1</td>
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<td></td>
<td>0.77</td>
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<td></td>
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<td>PRP2_1</td>
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<td>0.81</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
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<td>0.60</td>
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<td></td>
<td>0.86</td>
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<tr>
<td>ATU4_1</td>
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<td></td>
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<td></td>
<td>0.83</td>
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<tr>
<td>ATU5_1</td>
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<td></td>
<td></td>
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<td>0.83</td>
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</tr>
<tr>
<td>SN1_1</td>
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<tr>
<td>PBC1_1</td>
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<td>0.72</td>
<td></td>
<td>0.63</td>
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<tr>
<td>PBC3_1</td>
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<td></td>
<td></td>
<td>0.72</td>
<td></td>
<td>0.63</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Extraction Method: Maximum Likelihood.
Rotation Method: Oblimin with Kaiser Normalization.
Loadings above 0.2 are retained in the table.

The results clearly support the presence of nine factors corresponding to the nine construct or latent variables, and support the correlation between the measurement variables. The strong loading of the PU variable on the ATU factor is potentially explained by the high correlation expected between PU and ATU in the theoretical model (Davis et al., 1989). Generally, factor loadings are greater than 0.5 indicating good fit of individual measure to
identified factors (B. G. Tabachnick et al., 2001) but with some exceptions in relation to Intention to Buy and Relationship Quality measures, which are clearly identified as distinct factors.

On this basis the decision was made to proceed to Confirmatory Factor Analysis to further investigate and to analyse more effectively the fit of the individual measures to identified factors. Confirmatory factor analysis is a tool that enables either confirmation or rejection of a preconceived measurement theory (Hair et al., 2010, p. 693).

7.4.2 Confirmatory Factor Analysis

Confirmatory factor analysis was carried out on the data using Lisrel 8, applying maximum likelihood and utilising Satorra-Bentler scaling. The results of the analysis are shown below in Figure 29. In the analysis the potential concerns identified in exploratory factor analysis in relation to the measures for Perceived Usefulness, Relationship Quality and Intention to Buy are addressed as all measures appear to have strong factor loadings to their identified latent constructs.
Factor loadings of 0.5 or larger are considered acceptable (Hair et al., 2010), showing that the measurement model for each latent variable appears to be sound. In particular the loadings for both PU and ATU each exceed 0.78 showing strong significance. Each variable is considered in more detail in turn
below in Tables 51 to 59 using Lisrel 8 Simplis output. Note that the loadings are not standardised in the Simplis output below, but are standardised in Figure 29 above based on Lisrel output.

Unstandardised parameter estimates show the resulting change in the measurement variable from a one unit change in the latent variable all other things being fixed (Diamantopoulos & Siguaw, 2000, p. 59). Standardised parameter estimates shows the resulting change in a dependent (i.e. in this case measurement) variable from a one standard deviation change in an independent (in this case the latent) variable (Diamantopoulos & Siguaw, 2000, p. 65).

Table 51: CFA Main Data - Perceived Value For Money

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PVM1 = 1.70*PVM Errorvar.= 0.96 R² = 0.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.081)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>t=20.89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVM2 = 1.78*PVM Errorvar.= 0.51 R² = 0.86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.058)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>t=30.57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVM3 = 0.88*PVM Errorvar.= 0.62 R² = 0.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.068)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>t=13.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The above shows t-values greater than 3 (statistically significant to .01 level) for the measurement variables and strong R² values (greater than 0.5) implying the measurement model for the latent variable is sound (Diamantopoulos & Siguaw, 2000).
Table 52: CFA Main Study - Perceived Relative Price

<table>
<thead>
<tr>
<th>PRP1</th>
<th>2.01*PRP</th>
<th>Error var. = 1.86</th>
<th>$R^2 = 0.68$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.077)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t=26.16</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PRP2</th>
<th>0.80*PRP</th>
<th>Error var. = 0.13</th>
<th>$R^2 = 0.83$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.030)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t=26.87</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PRP3</th>
<th>1.04*PRP</th>
<th>Error var. = 0.53</th>
<th>$R^2 = 0.67$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.060)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t=17.53</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The above shows t-values greater than 3 (statistically significant to .01 level) for the measurement variables and strong $R^2$ values (greater than 0.5) implying the measurement model for the latent variable is sound (Diamantopoulos & Siguaw, 2000).

Table 53: CFA Main Study – Intention to Buy

<table>
<thead>
<tr>
<th>ITB</th>
<th>1.15*ITB</th>
<th>Error var. = 0.67</th>
<th>$R^2 = 0.66$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.057)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t=19.99</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITB</th>
<th>2.45*ITB</th>
<th>Error var. = 1.20</th>
<th>$R^2 = 0.83$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.043)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t=57.48</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITB</th>
<th>1.19*ITB</th>
<th>Error var. = 0.14</th>
<th>$R^2 = 0.91$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.015)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t=78.54</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The above shows t-values greater than 3 (statistically significant to .01 level) for the measurement variables and strong $R^2$ values (greater than 0.5) implying the measurement model for the latent variable is sound (Diamantopoulos & Siguaw, 2000).

Table 54: CFA Main Study – Perceived Ease of Use

<table>
<thead>
<tr>
<th></th>
<th>PEOU1 = 1.46*PEOU</th>
<th>Errorvar. = 1.81</th>
<th>$R^2 = 0.54$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(0.11)</td>
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</tr>
<tr>
<td>$t$</td>
<td>13.12</td>
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<tr>
<td></td>
<td>PEOU = 0.99*PEOU</td>
<td>Errorvar. = 0.42</td>
<td>$R^2 = 0.70$</td>
</tr>
<tr>
<td></td>
<td>(0.060)</td>
<td></td>
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<tr>
<td>$t$</td>
<td>16.63</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>PEOU = 2.26*PEOU</td>
<td>Errorvar. = 1.01</td>
<td>$R^2 = 0.83$</td>
</tr>
<tr>
<td></td>
<td>(0.13)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$t$</td>
<td>17.39</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The above shows t-values greater than 3 (statistically significant to .01 level) for the measurement variables and strong $R^2$ values (greater than 0.5) implying the measurement model for the latent variable is sound (Diamantopoulos & Siguaw, 2000).
Table 55: CFA Main Study – Relationship Quality

<table>
<thead>
<tr>
<th>RQ</th>
<th>Coefficient</th>
<th>Errorvar.</th>
<th>R²</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ1</td>
<td>2.06*RQ</td>
<td>11.47</td>
<td>0.27</td>
<td>7.08</td>
</tr>
<tr>
<td></td>
<td>(0.29)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RQ2</td>
<td>0.53*RQ</td>
<td>0.62</td>
<td>0.32</td>
<td>6.64</td>
</tr>
<tr>
<td></td>
<td>(0.080)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RQ3</td>
<td>0.96*RQ</td>
<td>0.47</td>
<td>0.66</td>
<td>18.87</td>
</tr>
<tr>
<td></td>
<td>(0.051)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RQ4</td>
<td>3.14*RQ</td>
<td>5.86</td>
<td>0.63</td>
<td>15.91</td>
</tr>
<tr>
<td></td>
<td>(0.20)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RQ5</td>
<td>1.24*RQ</td>
<td>4.38</td>
<td>0.26</td>
<td>6.10</td>
</tr>
<tr>
<td></td>
<td>(0.20)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RQ6</td>
<td>1.22*RQ</td>
<td>2.06</td>
<td>0.42</td>
<td>9.86</td>
</tr>
<tr>
<td></td>
<td>(0.12)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RQ7</td>
<td>2.89*RQ</td>
<td>7.39</td>
<td>0.53</td>
<td>12.89</td>
</tr>
<tr>
<td></td>
<td>(0.22)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The above shows t-values greater than 3 (statistically significant to .01 level) for the measurement variables implying that the measurement model for the latent variable is sound (Diamantopoulos & Siguaw, 2000). However, the $R^2$ values for some of the measures are only moderate (between .25 and .5) so are only reasonably successful as measures of the latent variable as they explain less than 50% of variance (Diamantopoulos & Siguaw, 2000). The measures do, however, have a statistically significant relationship with the latent variable, and have loadings greater than 0.5, and therefore nothing indicates that any measure should be dropped.
The above shows t-values greater than 3 (statistically significant to .01 level) for the measurement variables and strong $R^2$ values (greater than 0.5) implying the measurement model for the latent variable is sound (Diamantopoulos & Siguaw, 2000).

### Table 56: CFA Main Study – Perceived Usefulness

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$PU_1$</td>
<td>$1.91*PU$</td>
<td>Errorvar.$= 2.26$</td>
<td>$R^2 = 0.62$</td>
<td></td>
</tr>
<tr>
<td>t</td>
<td>12.44</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$PU_2$</td>
<td>$1.24*PU$</td>
<td>Errorvar.$= 1.00$</td>
<td>$R^2 = 0.61$</td>
<td></td>
</tr>
<tr>
<td>t</td>
<td>12.53</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$PU_3$</td>
<td>$2.63*PU$</td>
<td>Errorvar.$= 0.17$</td>
<td>$R^2 = 0.98$</td>
<td></td>
</tr>
<tr>
<td>t</td>
<td>22.99</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 57: CFA Main Study – Attitude to Use

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$ATU_1$</td>
<td>$2.13*ATU$</td>
<td>Errorvar.$= 1.37$</td>
<td>$R^2 = 0.77$</td>
<td></td>
</tr>
<tr>
<td>t</td>
<td>25.08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$ATU_2$</td>
<td>$3.21*ATU$</td>
<td>Errorvar.$= 2.58$</td>
<td>$R^2 = 0.80$</td>
<td></td>
</tr>
<tr>
<td>t</td>
<td>44.07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$ATU_3$</td>
<td>$2.25*ATU$</td>
<td>Errorvar.$= 0.86$</td>
<td>$R^2 = 0.85$</td>
<td></td>
</tr>
<tr>
<td>t</td>
<td>65.24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$ATU_4$</td>
<td>$7.95*ATU$</td>
<td>Errorvar.$= 6.95$</td>
<td>$R^2 = 0.90$</td>
<td></td>
</tr>
<tr>
<td>t</td>
<td>78.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$ATU_5$</td>
<td>$1.73*ATU$</td>
<td>Errorvar.$= 0.56$</td>
<td>$R^2 = 0.84$</td>
<td></td>
</tr>
<tr>
<td>t</td>
<td>51.42</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The above shows t-values greater than 3 (statistically significant to .01 level) for the measurement variables and strong $R^2$ values (greater than 0.5) implying the measurement model for the latent variable is sound (Diamantopoulos & Siguaw, 2000).

<table>
<thead>
<tr>
<th>SN1</th>
<th>0.90*SN</th>
<th>Errorvar= 0.42</th>
<th>$R^2 = 0.65$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(0.045)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>t=19.94</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SN2</td>
<td>2.83*SN</td>
<td>Errorvar= 2.11</td>
<td>$R^2 = 0.79$</td>
</tr>
<tr>
<td></td>
<td>(0.20)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>t=14.34</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SN3</td>
<td>2.17*SN</td>
<td>Errorvar= 3.19</td>
<td>$R^2 = 0.60$</td>
</tr>
<tr>
<td></td>
<td>(0.17)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>t=12.49</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The above shows t-values greater than 3 (statistically significant to .01 level) for the measurement variables and strong $R^2$ values (greater than 0.5) implying the measurement model for the latent variable is sound (Diamantopoulos & Siguaw, 2000).
Table 59: CFA Main Study – Perceived Behavioural Control

<table>
<thead>
<tr>
<th>PBC1</th>
<th>5.38*PBC</th>
<th>Errorvar.</th>
<th>41.24</th>
<th>$R^2 = 0.41$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(0.79)</td>
<td></td>
<td></td>
<td>t=6.77</td>
</tr>
<tr>
<td>PBC2</td>
<td>5.31*PBC</td>
<td>Errorvar.</td>
<td>11.19</td>
<td>$R^2 = 0.72$</td>
</tr>
<tr>
<td></td>
<td>(0.48)</td>
<td></td>
<td></td>
<td>t=11.14</td>
</tr>
<tr>
<td>PBC3</td>
<td>5.12*PBC</td>
<td>Errorvar.</td>
<td>43.93</td>
<td>$R^2 = 0.37$</td>
</tr>
<tr>
<td></td>
<td>(0.90)</td>
<td></td>
<td></td>
<td>t=5.68</td>
</tr>
</tbody>
</table>

The above shows t-values greater than 3 (statistically significant to .01 level) for the measurement variables implying that the measurement model for the latent variable is sound (Diamantopoulos & Siguaw, 2000). However, the $R^2$ values for some of the measures are only moderate (between .25 and .5) so are only reasonably successful as measures of the latent variable as they explain less than 50% of variance (Diamantopoulos & Siguaw, 2000). The measures do, however, have a statistically significant relationship with the latent variable, and have loadings greater than 0.5, and therefore nothing indicates that any measure should be dropped.

A final comment on all of the loadings and measures is appropriate. It is accepted that standardised factor loadings should be significant, greater than 0.5, and preferably 0.7 or higher according to Tabachnick and Fidell (2007). In all cases all factor loadings in the CFA are significant at 0.01, and all are greater than 0.5. Most are greater than 0.7. A value of 0.5 is described as acceptable by Hair et al. (2010) and as a minimum accepted level by Anderson
& Gerbing, (1988). Similarly Diamantopoulos and Siguaw, (2000) describe loadings as moderate by reference to $R^2$ greater than .25 (and $R^2$ is equivalent to the factor loading $\lambda^2$ - and $0.5^2$ is equal to 0.25).

On this basis it is felt that all of the measures can be retained. However in addition, RQ1 and RQ2 (which have factor loadings close to 0.5) specifically represent the measures for the dimension of Commitment in the Palmatier (2008) construct used in the study. Exclusion of these measures would mean this dimension of relationship quality was not tested. The overall Relationship Quality construct had good Cronbach’s Alpha and Composite Reliability scores (exceeding 0.8), indicating that overall the measures for the latent variable are internally consistent and reliable as will be seen below.

7.5 Testing Validity and Reliability of the Measurement Model

As outlined in Chapter 4, construct validity of the measurement model concerns the extent to which the observed variables correctly reflect the latent variable they are meant to represent. Two dimensions of construct validity, composite reliability and discriminant validity, are examined below.

7.5.1 Cronbach’s alpha

Individual measure reliability was examined by reference to each measure’s Cronbach’s alpha, calculated using SPSS as follows in Table 60.
Table 60: Cronbach's Alpha for main study constructs

<table>
<thead>
<tr>
<th>Construct</th>
<th>Cronbach’s Alpha</th>
<th>Number of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVM</td>
<td>.902</td>
<td>3</td>
</tr>
<tr>
<td>PRP</td>
<td>.874</td>
<td>3</td>
</tr>
<tr>
<td>ITB</td>
<td>.943</td>
<td>3</td>
</tr>
<tr>
<td>RQ</td>
<td>.852</td>
<td>7</td>
</tr>
<tr>
<td>PEOU</td>
<td>.915</td>
<td>3</td>
</tr>
<tr>
<td>PU</td>
<td>.915</td>
<td>3</td>
</tr>
<tr>
<td>ATU</td>
<td>.972</td>
<td>5</td>
</tr>
<tr>
<td>SN</td>
<td>.913</td>
<td>3</td>
</tr>
<tr>
<td>PBC</td>
<td>.796</td>
<td>3</td>
</tr>
</tbody>
</table>

Cronbach’s alpha coefficient is a measure of internal consistency, and increases as intercorrelation between measures of a latent variable increase. As a minimum, a value of greater than 0.6 is required (Garson, 2010), although 0.7 is often quoted as a lowest limit (Hair et al., 2010). In the above case, all alpha coefficients exceed 0.8 (with the exception of Perceived Behavioural Control or PBC just below that-value) indicating that the reliability of each measure is excellent.

7.5.2 Composite Reliability
Composite Reliability was calculated (using data from the Confirmatory Factor Analysis) from first principles using the formula:

\[
\text{Composite Reliability (CR)} = \frac{\left(\sum_{i=1}^{n} \lambda_i\right)^2}{\sum_{i=1}^{n} \lambda_i^2 + \sum_{i=1}^{n} e_i}
\]

where \( \lambda_i \) denotes the standardised factor loading for item \( i \) and \( e_i \) is the error variance term. The Composite Reliability scores for each construct are shown in Table 61 below.

Table 61: Composite Reliability Main Model

<table>
<thead>
<tr>
<th>CONSTRUCT</th>
<th>COMPOSITE RELIABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEOU</td>
<td>0.87</td>
</tr>
<tr>
<td>PU</td>
<td>0.89</td>
</tr>
<tr>
<td>PBC</td>
<td>0.75</td>
</tr>
<tr>
<td>ITB</td>
<td>0.92</td>
</tr>
<tr>
<td>SN</td>
<td>0.86</td>
</tr>
<tr>
<td>PRP</td>
<td>0.89</td>
</tr>
<tr>
<td>PVM</td>
<td>0.88</td>
</tr>
<tr>
<td>ATU</td>
<td>0.96</td>
</tr>
<tr>
<td>RQ</td>
<td>0.84</td>
</tr>
</tbody>
</table>
The composite reliability scores all significantly exceed 0.7 and support composite reliability (Gerbing & Anderson, 1988).

7.5.3 Discriminant Validity

If there is discriminant validity between two constructs, their AVE (Average Variance Extracted) scores should be higher than the squared correlation estimate between the two constructs (Hair et al., 2010).

AVE is calculated for each construct as:

$$\text{AVE} = \frac{\sum_{i=1}^{n} \lambda_i^2}{\sum_{i=1}^{n} \lambda_i^2 + \sum_{i=1}^{n} e_i}$$

where $\lambda_i$ denotes the standardised factor loading for item $i$ and $e_i$ is the error variance term. AVE was calculated for each construct as follows in Table 62.
Table 62: AVE main study

<table>
<thead>
<tr>
<th>CONSTRUCT</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEOU</td>
<td>0.69</td>
</tr>
<tr>
<td>PU</td>
<td>0.74</td>
</tr>
<tr>
<td>PBC</td>
<td>0.50</td>
</tr>
<tr>
<td>ITB</td>
<td>0.80</td>
</tr>
<tr>
<td>SN</td>
<td>0.68</td>
</tr>
<tr>
<td>PRP</td>
<td>0.73</td>
</tr>
<tr>
<td>PVM</td>
<td>0.72</td>
</tr>
<tr>
<td>ATU</td>
<td>0.83</td>
</tr>
<tr>
<td>RQ</td>
<td>0.44</td>
</tr>
</tbody>
</table>

In all but two cases, the AVE is greater than 0.5 indicating convergent validity (Diamantopoulos & Siguaw, 2006). In the case of Relationship Quality (0.44) and Perceived Behavioural Control (0.5) the values are close to or equal to 0.5 and so overall these are not crucial deficiencies (Diamantopoulos & Siguaw, 2006, p. 92). The process of discriminant validity analysis should show whether the low AVE score indicates a risk that Relationship Quality and Perceived Behavioural Control are not fully distinct from other constructs.

The squared correlation between constructs are calculated and shown, and AVE values are reported as bold on the diagonal, in Table 63 below.
<table>
<thead>
<tr>
<th></th>
<th>PEOU</th>
<th>PU</th>
<th>PBC</th>
<th>ITB</th>
<th>SN</th>
<th>PRP</th>
<th>PVM</th>
<th>ATU</th>
<th>RQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEOU</td>
<td>0.69</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PU</td>
<td>0.02</td>
<td>0.74</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBC</td>
<td>0.14</td>
<td>0.04</td>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITB</td>
<td>0.07</td>
<td>0.00</td>
<td>0.04</td>
<td>0.80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SN</td>
<td>0.16</td>
<td>0.03</td>
<td>0.02</td>
<td>0.07</td>
<td>0.68</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRP</td>
<td>0.05</td>
<td>0.00</td>
<td>0.02</td>
<td>0.03</td>
<td>0.02</td>
<td>0.73</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVM</td>
<td>0.18</td>
<td>0.08</td>
<td>0.06</td>
<td>0.08</td>
<td>0.11</td>
<td>0.18</td>
<td>0.72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATU</td>
<td>0.22</td>
<td>0.09</td>
<td>0.05</td>
<td>0.09</td>
<td>0.14</td>
<td>0.02</td>
<td>0.10</td>
<td>0.83</td>
<td></td>
</tr>
<tr>
<td>RQ</td>
<td>0.12</td>
<td>0.11</td>
<td>0.18</td>
<td>0.01</td>
<td>0.06</td>
<td>0.00</td>
<td>0.06</td>
<td>0.11</td>
<td>0.44</td>
</tr>
</tbody>
</table>

It can be seen that in all cases, the relevant AVE scores are significantly higher than the squared correlations for each pair of variables, including Relationship Quality and Perceived Behavioural Control. For this reason, it is felt that discriminant validity is maintained.

### 7.6 Conclusion

This chapter started with an analysis of the different dimensions of the data present, showing that the relatively small amount of data utilised had a wide range of industries and geographic locations, a reasonable gender mix and a range of sizes of tax function and turnover (all in a large company range however). The analysis shows generally that for the majority of situations
procurement is not involved in the technology buying process as anticipated. Unfortunately, the small sample size means any attempt at analysing group differences on these dimensions would lack any statistical power and would be questionable.

An examination of the measurement model started with exploratory and confirmatory factor analysis, and was followed by analysis of validity and reliability of the measures and measurement model. The confirmatory factor analysis appears to support the theoretical latent constructs and their measures. All individual measures appear to load well or moderately well to their latent variable with statistical significance. Analysis showed that composite reliability and discriminant validity appear to have been attained.

There is no evidence to suggest that any construct or measure requires amendment or must be dropped based on the above, although it is noted that some of the measures have only moderate $R^2$ values and loadings in relation to their latent variable – in particular measures for Relationship Quality.
8. CHAPTER 8: DATA ANALYSIS – STRUCTURAL MODEL

8.1 Introduction

Having validated the measurement model, in this chapter evaluation of the structural model is described. The final model for analysis using Lisrel 8 software is reproduced below in Figure 30.

Figure 30: Final Structural Model
8.2 Methodology for Analysis of the Structural Model

Structural Equation Modelling was carried out in Lisrel using a Maximum Likelihood estimator and applying Satorra-Bentler scaling to correct for use of ordinal data and inherent failure to adhere to multivariate normality. As outlined in Chapter 4, where data is severely non-normal and ordinal use of Maximum Likelihood (a normal theory estimator) together with Satorra-Bentler scaling has been advocated where there are at least 5 ordered categories (Finney & DiStefano, 2006). In this study, there are 7 ordered categories for response in relation to each measure. The Lisrel syntax used is attached at Appendix D.

Set out below in Figure 31 is the structural model in path diagram form as set up within Lisrel, showing the reproduction of the structural model in the software, and showing all of the measures utilised for each of the nine latent variables in the final model. As outlined in chapter 4 above, each of the measures is treated as reflective, so causality flows from the relevant latent variable to the measure in the structural model.
8.3 Results of Analysis of the Structural Model

First the output loadings, variances and t-values for the analysis of the structural model is reviewed. Then model fit is discussed.

8.3.1 Analysis of the Structural Model Output

The path model output from Lisrel, showing standardised loadings is shown in Figure 32 below. Immediately of interest is the weak value for the relationship between Relationship Quality and Intention to Buy. The standardised value is 0.01, indicating that a one standard deviation movement in Relationship Quality would only result in a 0.01 standard deviation movement in Intention to Buy. This would seem to imply that, based on this data, Relationship
Quality is having limited impact on the forming of a buying intention. Also of interest is the strong relationship implied between Perceived Behavioural Control and Intention to Buy with a standardised coefficient of 0.42.

Figure 32: Structural Model - Standardised Solution Main Study

The following structural equation results are output from the model in Table 64 below – but note the loadings are not in non-standardised form. As outlined in Chapter 7, unstandardised parameter estimates show the resulting change in the measurement variable from a one unit change in the latent variable all other things being fixed (Diamantopoulos & Siguaw, 2000, p. 59)
Table 64: Structural Equations

<table>
<thead>
<tr>
<th>Equation for Perceived Usefulness</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PU = 0.80*PEOU Errorvar.= 2.05</td>
<td>R² = 0.42</td>
</tr>
<tr>
<td>(0.14)  (0.44)</td>
<td></td>
</tr>
<tr>
<td>t=5.92  t=4.63</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equation for Attitude to Use</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ATU = 0.93<em>PU + 0.23</em>PEOU</td>
<td>Errorvar.= 0.67  R² = 0.86</td>
</tr>
<tr>
<td>(0.11)  (0.12)</td>
<td></td>
</tr>
<tr>
<td>t=8.58  t=7.91</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equation for Perceived Value for Money</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PVM = 0.41<em>ATU + 0.46</em>PRP Errorvar.= 1.31  R² = 0.60</td>
<td></td>
</tr>
<tr>
<td>(0.044)  (0.070)</td>
<td></td>
</tr>
<tr>
<td>t=6.52  t=6.56</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equation for Intention to Buy</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ITB = 0.16<em>PU + 0.16</em>PVM + 0.35<em>SN + 0.081</em>PBC + 0.0046*RQ Errorvar.= 0.32  R² = 0.76</td>
<td></td>
</tr>
<tr>
<td>(0.044)  (0.046)  (0.086)  (0.019)  (0.045)  (0.078)</td>
<td></td>
</tr>
<tr>
<td>t=3.58  t=3.37  t=4.03  t=4.22  t=0.10  t=4.07</td>
<td></td>
</tr>
</tbody>
</table>

Examining each of these in turn, from the first equation, the strong influence on Perceived Usefulness of Perceived Ease of Use proposed in Technology Acceptance theory is demonstrated, with 42% of variance in Perceived Usefulness explained by Perceived Ease of Use. The t-values shown are greater than 3 (statistically significant to .01 level).

In the second equation for Attitude to Use, the relationships between Attitude to Use, Perceived Usefulness and Perceived Ease of Use proposed in Technology Acceptance theory are seen. The 86% R² value for variance explained shows that Attitude to Use is strongly explained by Perceived Usefulness and Perceived Ease of Use. The t-values for Perceived Ease of Use and the error variance are not statistically significant at the .01 level, but are close to and above the .05 level respectively and hence reasonable.
In the third equation for Perceived Value for Money, 60% of variance is explained by the two variables of Attitude to Use and Perceived Relative Price. This is in line with theory and is a strong result given two other potential explanatory variables for Perceived Value for Money were dropped for reasons of parsimony and in order to achieve statistical power given the relatively small amount of empirical data available. The t-values shown are greater than 3 (statistically significant to .01 level).

In the fourth and main equation in relation to Intention to Buy, the strong $R^2$ value of 76% shows that the model overall explains successfully a large proportion of variance in Intention to Buy. The very poor t-value for Relationship Quality implies the relationship predicted between it and Intention to Buy is not statistically significant and should be disregarded. All other t-values are statistically significant at the 0.01 level as they are greater than 3.

**8.3.2 Analysis of Model Fit**

As set out in Chapter 4, a two index strategy for evaluating model fit is recommended by Hu and Bentler (1999). They show through empirical testing that using a combination of two fit indices, one incremental and one absolute, performs better in identifying miss-specified models than any single index. In general, they recommend a cut off value of >.96 for CFI combined with
SRMR <0.10 (Hu & Bentler, 1999) in relation to complex models using non-normal data and with small (<250) sample sizes. The key fit statistics in relation to the model are set out in Table 65 below.

Table 65: Key Model Fit Statistics

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satorra-Bentler Scaled Chi-Square</td>
<td>609.26 (475 degrees of freedom)</td>
</tr>
<tr>
<td>Chi-Square / Degrees of Freedom</td>
<td>1.28</td>
</tr>
<tr>
<td>Root Mean Square Error of Approximation (RMSEA)</td>
<td>0.048</td>
</tr>
<tr>
<td>P-Value for Test of Close Fit (RMSEA &lt; 0.05)</td>
<td>0.62</td>
</tr>
<tr>
<td>Comparative Fit Index (CFI)</td>
<td>0.99</td>
</tr>
<tr>
<td>Incremental Fit Index (IFI)</td>
<td>0.99</td>
</tr>
<tr>
<td>Standardised RMR (SRMR)</td>
<td>0.090</td>
</tr>
</tbody>
</table>

A value of less than two for $\chi^2$/d.f. is, as a general rule, a simple measure of good fit (Carmines & McIver, 1981) but should be used with caution (Diamantopoulos & Siguaw, 2000). A value of less than 2 (1.28) is achieved for this model. In addition, the RMSEA value of 0.048 is indicative of good fit as it is less than 0.05 (Hair et al., 2010; Hu & Bentler, 1999). Critically, however, the CFI at 0.99 and SRMR at 0.09 fall within the two index cut-off values outlined above for small sample sizes with non-normal data. All of the above supports the structural model overall showing a good fit with the data.
8.4 Examination of Model Modification

As part of Lisrel 8 output, information about possible modifications to the model that might improve fit is automatically generated. However, modifications should only be made where clear and well founded theoretical bases or arguments for such a modification can be sustained, otherwise modification would amount to “capitalising on chance” (Diamantopoulos & Siguaw, 2000, p. 102). The model modifications suggested by Lisrel are shown in Figure 33 below.
The suggested modifications show the potential reduction in overall model Chi-Square values which could result from introducing a new path or correlation into the model. Changes involving the introduction of correlation between measurement error terms are ignored as unlikely to change the nature of the interaction between measurements and the latent constructs, or the relationship between latent variables, whilst they might make minor improvements to model fit. This is because the model already has good fit statistics associated with it.

The remaining potential modifications either relate to the loading of measures to latent variables (ATU to PVM3 and to PU1: and PU to PVM2) or relate to creating a relationship between latent variables (RQ and SN with PU). It is not proposed to test any of these modifications, as they are not supported by any underlying theory.

The suggested relationship between ATU and PVM3 is easily explained by the correlation between ATU and PVM as latent variables, but is not theorised. The suggested relationship between PU1 and ATU is again easily explained by the correlation between ATU and PU as latent variables, but is not theorised.

The suggested relationship between SN and PU is not theorised in the Technology Acceptance literature, and is disregarded on that basis. Subjective
norm in each of the Theory of Reasoned Action (Fishbein, 1967), Theory of Planned Behaviour (Ajzen & Madden, 1986) and Augmented Technology Acceptance Model (Taylor & Todd, 1995a) operates independently of Perceived Usefulness.

There is no theoretical support for linking Relationship Quality as a construct to Perceived Usefulness identified in the literature. However there is evidence in the literature of Trust being seen as an antecedent to Perceived Usefulness (Geffen et al., 2003; Pavlou, 2003). The Relationship Quality construct in this model is derived from Palmatier (2008). This sees Relationship Quality as a composite set of measures for relationship quality in a business to business context, covering dimensions of trust, commitment, reciprocity and exchange efficiency.

Given the above potential theoretical link between Relationship Quality and Perceived Usefulness, a revised model was created including a relationship between Relationship Quality and Perceived Usefulness. The relationship between Relationship Quality and Intention to Buy was dropped based on the findings of the main model that there was no statistically significant relationship between the two variables. The modified model is shown in Figure 34 below in standardised loadings form.
Structural equation Modelling was again carried out in Lisrel using a Maximum Likelihood estimator and applying Satorra-Bentler scaling to correct for use of ordinal data and inherent failure to adhere to multivariate normality. As outlined in Chapter 4, where data is severely non-normal and ordinal use of Maximum Likelihood (a normal theory estimator) together with Satorra-Bentler scaling has been advocated where there are at least 5 ordered categories (Finney & DiStefano, 2006). In this study, there are 7 ordered categories for response in relation to each measure. The Lisrel syntax used is attached at Appendix E.
Overall, the model fit statistics for the revised model show a better model fit as can be seen from Table 66 below:

Table 66: Key Modified Model Fit Statistics

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satorra-Bentler Scaled Chi-Square</td>
<td>593.19 (475 degrees of freedom)</td>
</tr>
<tr>
<td>Root Mean Square Error of Approximation (RMSEA)</td>
<td>0.045</td>
</tr>
<tr>
<td>P-Value for Test of Close Fit (RMSEA &lt; 0.05)</td>
<td>0.77</td>
</tr>
<tr>
<td>Comparative Fit Index (CFI)</td>
<td>0.99</td>
</tr>
<tr>
<td>Incremental Fit Index (IFI)</td>
<td>0.99</td>
</tr>
<tr>
<td>Standardised RMR (SRMR)</td>
<td>0.079</td>
</tr>
</tbody>
</table>

A value of less than two for $\chi^2$/d.f. is as a general rule a simple measure of good fit (Carmines & McIver, 1981) but should be used with caution (Diamantopoulos & Siguaw, 2000). A value of less than 2 is achieved for this model and the value is smaller than the previous model. In addition, the RMSEA value of 0.045 (previously 0.048) is indicative of good fit as it is less than 0.05 (Hair et al., 2010; Hu & Bentler, 1999). Critically, however, the CFI at 0.99 and SRMR at 0.079 (previously 0.090) fall within the two index cut-off values outlined above for small sample sizes with non-normal data. All of the above supports the structural model overall showing a good fit with the data and an improved fit compared with the previous model.
The following structural equation results are output from the model in Table 67 below – but note the loadings are not in non-standardised form. As outlined in Chapter 7, unstandardised parameter estimates show the resulting change in the measurement variable from a one unit change in the latent variable all other things being fixed (Diamantopoulos & Siguaw, 2000, p. 59)

Table 67: Structural Equations Revised Model

<table>
<thead>
<tr>
<th>Equation for Perceived Usefulness</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PU = 0.38<em>PEOU + 0.41</em>RQ</td>
<td>Errorvar.= 1.75</td>
<td>R² = 0.50</td>
<td></td>
</tr>
<tr>
<td>(0.16)</td>
<td>(0.099)</td>
<td>(0.41)</td>
<td></td>
</tr>
<tr>
<td>t=2.35</td>
<td>t=4.13</td>
<td>t=4.28</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equation for Attitude to Use</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ATU = 0.97<em>PU + 0.19</em>PEOU</td>
<td>Errorvar.= 0.62</td>
<td>R² = 0.87</td>
<td></td>
</tr>
<tr>
<td>(0.11)</td>
<td>(0.12)</td>
<td>(0.25)</td>
<td></td>
</tr>
<tr>
<td>t=8.68</td>
<td>t=1.61</td>
<td>t=2.51</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equation for Perceived Value for Money</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PVM = 0.42<em>ATU + 0.46</em>PRP</td>
<td>Errorvar.= 1.31</td>
<td>R² = 0.60</td>
<td></td>
</tr>
<tr>
<td>(0.062)</td>
<td>(0.068)</td>
<td>(0.31)</td>
<td></td>
</tr>
<tr>
<td>t=6.70</td>
<td>t=6.70</td>
<td>t=4.22</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equation for Intention to Buy</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ITB = 0.16<em>PU + 0.16</em>PVM + 0.35<em>SN + 0.081</em>PBC</td>
<td>Errorvar.= 0.32</td>
<td>R² = 0.76</td>
<td></td>
</tr>
<tr>
<td>(0.045)</td>
<td>(0.046)</td>
<td>(0.016)</td>
<td></td>
</tr>
<tr>
<td>t=3.59</td>
<td>t=3.42</td>
<td>t=4.34</td>
<td></td>
</tr>
<tr>
<td>t=5.06</td>
<td>t=4.22</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Examining each of these in turn, from the first equation there is an increase in the amount of variance in Perceived Usefulness explained (now 50% was 42%) in comparison with the initial model. This increase is explained by the inclusion of Relationship Quality. The t-values shown are greater than 3 (statistically significant to .01 level) except in the case of PEOU which is greater than 2 (statistically significant to .05 level).
In the second equation for Attitude to Use, the relationships between Attitude to Use, Perceived Usefulness and Perceived Ease of Use proposed in Technology Acceptance theory are seen. The 87% $R^2$ value for variance explained shows that Attitude to Use is slightly better explained under the revised model (previously 86%). The t-value for Perceived Ease of Use is not statistically significant at the .01 level under the revised model however which is a cause for concern.

In the third equation for Perceived Value for Money 60% of variance is explained by the two variables of Attitude to Use and Perceived Relative Price. This is in line with theory and is a strong result given two other potential explanatory variables for Perceived Value for Money were dropped for reasons of parsimony and in order to achieve statistical power given the relatively small amount of empirical data available. The t-values shown are greater than 3 (statistically significant to .01 level).

In the fourth and main equation in relation to Intention to Buy, the strong $R^2$ value of 76% shows that the model overall explains successfully a large proportion of variance in Intention to Buy. Excluding Relationship Quality has had no impact on variance explained in Intention to Buy as $R^2$ is unchanged from the previous model. All t-values are statistically significant at the 0.01 level as they are greater than 3.
8.5 Conclusion

The above analysis now enables answers to the research questions and a review of the hypotheses to be considered.

8.5.1 Research Questions One and Two

1. *Does the Technology Acceptance Model appear to be supported in the context of tax technology?*

2. *Does the Augmented Technology Acceptance Model appear to be supported in the context of organisational buying?*

The first research question was answered as ‘yes’ in terms of the results of the analysis of the structural equation model in the pilot study. Further strong support for this and for a ‘yes’ answer to research Question Two is found in the review of the results from the main study Structural Equation Modelling. Strong statistically significant relationships were found as anticipated between each of the latent variables mapping to the Augmented Technology Acceptance Model. For example, 87% of variance in Attitude to Use was explained by Perceived Usefulness and Perceived Ease of Use. Also both Subjective Norm and Perceived Behavioural control had a strong relationship with Intention to Buy.
8.5.2 Research Question Three

The third research question as follows:

3. Does Relationship Quality influence Intention to Buy in the context of organisational buying of tax technology?

Perhaps, at first sight surprisingly, the structural equation model results would not support answering ‘yes’ to the research question and would suggest rejecting its related research hypothesis:

H9b: Relationship Quality is positively related to Intention to Buy

The relationship between the Relationship Quality latent variable and the Intention to Buy latent variable had a very low t-value and was not therefore statistically significant, causing the hypothesis to be rejected.

This may not be as unusual a result as it seems. Typically, there are a limited number of acceptable tax technology and service providers to large organisations, so those large organisations develop long term relationships with all of them over a range of interactions and transactions. It should be noted, however, that an individual tax technology sale is typically non routine or one-off. For this reason, as strong relationships typically exist with all vendors, then Relationship Quality may not be a major differentiating factor or consideration in tax technology buying decisions.
However, this does not contradict the finding that Relationship Quality appears to be positively related to Perceived Usefulness, which at least for the trust component of Relationship Quality is supported in the literature as highlighted above (Gefen et al., 2003; Pavlou, 2003). It is clear that conceptually greater trust in an organisation could lead to improved perceptions of the functionality of its technology product (Gefen et al., 2003; Pavlou, 2003).

### 8.5.3 Research Question Four

The fourth research question is as follows:

4.  *Is Attitude to Use of the technology by the lead individual in the buying decision related positively to Perceived Value for Money of the technology?*

Strong support for a ‘yes’ answer to research Question Four is found in the review of the results from the main study structural equation model. Strong statistically significant relationships were found as anticipated between Attitude to Use and Perceived Value for Money. In fact, together with Perceived Relative Price, Attitude to Use explained 60% of the variance in Perceived Value for Money.

### 8.5.4 Research Question Five

The fifth research question is as follows:
5. Where Perceived Value for Money is positively related to Attitude to Use, is there a clear relationship between Perceived Value for Money and Intention to Buy the technology?

Strong support for a ‘yes’ answer to research Question Five is found in the review of the results from the main study structural equation model. Strong statistically significant relationships were found as anticipated between Perceived Value for Money and Intention to Buy.

8.5.5 Research Question Six

Finally, the last research question drawing together all of the above was as follows:

6. Can all of the relationships addressed above operate within a single explanatory model of Intention to Buy technology in a tax technology context?

This is, in effect, asking whether the structural model was sound, and had good explanatory power in relation to Intention to Buy. The answer to this is a strong ‘yes’. The model explained 76% of the variance in Intention to Buy, and overall, the model had fit statistics indicating that the model had a good fit with the empirical data. In general, all of the hypothesised relationships between constructs in the final model were strongly supported, with the
exception of the relationship between Relationship Quality and Intention to Buy.

This is not the unusual result it appears to be. Because there are a limited number of recognised tax technology and service providers available to large organisations, those large organisations tend to develop long term relationships with all of them over a range of interactions and transactions. Also, an individual tax technology sale is typically non-routine or one-off and for this reason as strong relationships typically exist with all vendors. This explains why Relationship Quality may not be a major differentiating factor or consideration in tax technology buying decisions. However, as shown in the modified structural model, Relationship Quality may still have an impact on Perceived Usefulness as increased trust in the vendor organisation can positively improve the perceived usefulness of their technology.
9. CHAPTER 9: DISCUSSION AND CONCLUSIONS

9.1 Discussion

This study developed and empirically examined a model to help understand how key individuals in businesses form an intention to buy and utilise tax technology in the context of managing their business tax obligations. This is of high interest to a wide range of managers, and of interest to researchers in the areas of technology acceptance and business to business marketing generally.

The core research questions guiding this study were:

1. *Does the Technology Acceptance Model appear to be supported in the context of tax technology?*

2. *Does the Augmented Technology Acceptance Model appear to be supported in the context of organisational buying?*

3. *Does Relationship Quality influence Intention to Buy in the context of organisational buying of tax technology?*

4. *Is Attitude to Use of the technology by the lead individual in the buying decision related positively to Perceived Value for Money of the technology?*

5. *Where Perceived Value for Money is positively related to Attitude to Use, is there a clear relationship between Perceived Value for Money and Intention to Buy the technology?*
6. *Can all of the relationships addressed above operate within a single explanatory model of Intention to Buy technology in a tax technology context?*

In examining these research questions, models in both a pilot and main study were developed from existing literature, and were empirically tested through Structural Equation Modelling using data gathered through quantitative surveys. As the main study progressed, due to inadequate sample size two variables and three hypotheses were dropped – however, these did not directly change the research questions (See Section 6.5).

An answer to each of those research questions and their related hypotheses is provided below.

**9.1.1 First Research Question**

*Does the Technology Acceptance Model appear to be supported in the context of tax technology?*

Related hypotheses:

*H1a: Perceived Ease of Use is positively related to Perceived Usefulness*

*H1b: Perceived Ease of Use is positively related to Intention to Use*

*H2: Perceived Usefulness is positively related to Intention to Use*
Structural equation Modelling and factor analysis techniques considered in the pilot study confirmed that increased perceived ease of use of tax technology is likely to lead to increased perceived usefulness of that technology. It also confirmed that increased perceived usefulness of the tax technology is likely to lead to increased intention to use the technology. The direct relationship between perceived ease of use and intention to use tax technology was only weakly supported statistically. This is in line with previous studies (Gefen et al., 2000; King & He, 2006; Subramanian, 1994). Overall, the model had strong fit statistics and appeared to explain 77% of variance in intention to use tax technology (see Section 5.5). This indicates the answer to the first research question should be:

*The Technology Acceptance Model appears to be supported in the context of tax technology.*

### 9.1.2 Second Research Question

**Does the Augmented Technology Acceptance Model appear to be supported in the context of organisational buying?**

Related hypotheses:

*H1a: Perceived Ease of Use is positively related to Perceived Usefulness

*H1b: Perceived Ease of Use is positively related to Attitude to Use*
**H2a: Perceived Usefulness is positively related to Attitude to Use**

**H2b: Perceived Usefulness is positively related to Intention to Buy**

**H3: Subjective Norm is positively related to Intention to Buy**

**H4: Perceived Behavioural Control is negatively related to Intention to Buy**

Structural equation Modelling and factor analysis techniques considered in the main study confirmed that increased perceived ease of use of tax technology is likely to lead to increased perceived usefulness of that technology. It also confirmed that increased perceived usefulness of the tax technology is likely to lead to an increased positive attitude towards both use of and intention to use the technology. The direct relationship between perceived ease of use and attitude to use tax technology was only weakly supported statistically. This is in line with some previous studies – see, for example, the meta-study by King & He (2006).

Structural Equation Modelling and factor analysis techniques considered in the main study confirmed that both an increase in the belief that others wanting the respondent to buy the tax technology (Subjective Norm), and a decrease in the belief of the respondent that they will have available necessary resources to be able to buy the technology (Perceived Behavioural Control), are likely to lead to an increase in intention to buy tax technology. All hypotheses were
strongly statistically significant, with the exception of H1a which was weakly supported, just falling short of the 0.05 level (see Section 8.2). This indicates the answer to the second research question should be:

*The Augmented Technology Acceptance Model appears to be supported in the context of organisational buying of tax technology.*

9.1.3 Third Research Question

*Does Relationship Quality influence Intention to Buy in the context of organisational buying of tax technology?*

Related hypothesis:

*H9b: Relationship Quality is positively related to Intention to Buy*

Structural Equation Modelling and factor analysis techniques considered in the main study failed to confirm that increased quality of the relationship between the respondent and the vendor is likely to lead to increased intention to buy tax technology. The relationship between the Relationship Quality latent variable and the Intention to Buy latent variable had a very low t-value and was not therefore statistically significant, causing the hypothesis stated above to be rejected (see Section 8.2).
As outlined in Section 8.2.1 above, this may not be as unusual a result as it seems. Typically, there are a limited number of acceptable tax technology and service providers to large organisations, so those large organisations develop long term relationships with all of them over a range of interactions and transactions. It should be noted, however, that an individual tax technology sale is typically non-routine or one-off. For this reason, as strong relationships typically exist with all vendors, then Relationship Quality may not be a major differentiating factor or consideration in tax technology buying decisions.

This indicates the answer to the third research question should be:

**Relationship Quality does not appear to influence Intention to Buy in the context of organisational buying of tax technology.**

However, as shown in the modified model, Relationship Quality may still have an impact on Perceived Usefulness. This is because increased trust in the vendor organisation can positively impact the perceived usefulness of their technology.

### 9.1.4 Fourth Research Question

*Is Attitude to Use of the technology by the lead individual in the buying decision related positively to Perceived Value for Money of the technology?*
Related hypothesis:

\textit{H5: Attitude to Use is positively related to Perceived Value for Money}

And, additionally in relation to Perceived Value for Money

\textit{H8: Perceived Relative Price is negatively related to Perceived Value for Money}

Structural Equation Modelling and factor analysis techniques considered in the main study confirmed that an increase in positive attitude towards use of tax technology is likely to lead to an increased perception of the value for money of the technology. The hypothesised relationship appears to be strongly statistically significant, and together with price factors attitude towards use of the technology explains 60\% of the variance in Perceived Value for Money (see Section 8.2). This indicates the answer to the fourth research question should be:

\textit{Attitude to Use of the technology by the lead individual in the buying decision is positively related to the Perceived Value for Money of the technology.}

9.1.5 Fifth Research Question
Where Perceived Value for Money is positively related to Attitude to Use, is there a clear relationship between Perceived Value for Money and Intention to Buy the technology?

Related hypothesis:

H10: Perceived Value for Money is positively related to Intention to Buy

Structural Equation Modelling and factor analysis techniques considered in the pilot study confirmed that increased perceived value for money of the tax technology is likely to lead to increased intention to buy the tax technology, in a context where a strong relationship between attitude to use of the technology and perceived value for money exists. The hypothesised relationship appears to be strongly statistically significant (see Section 8.2). This indicates the answer to the fifth research question should be:

Where Perceived Value for Money is positively related to Attitude to Use, there a clear relationship between Perceived Value for Money and Intention to Buy the technology.

9.1.6 Sixth Research Question
Can all of the relationships addressed above operate within a single explanatory model of Intention to Buy technology in a tax technology context?

In general, all of the hypothesised relationships between latent variables in the final model were strongly supported, with the exception of the relationship between Relationship Quality and Intention to Buy, as outlined above. The model explained 76% of the variance in Intention to Buy, and overall the model had fit statistics indicating the model had a good fit with the empirical data. This implies the model has strong explanatory power based on a review of the empirical data (see Section 8.2). This indicates the answer to the fifth research question should be:

The relationships addressed above operate within a single model which helps to successfully explain the Intention to Buy tax technology.

9.2 Theoretical Contributions

This study adds to the body of knowledge in the areas of both technology acceptance and business to business marketing, and more importantly shows how a link between the two can be created which potentially could unlock a new stream of research in relation to business to business marketing of technology.

9.2.1 Contribution to technology acceptance research
Technology acceptance studies seek to identify factors that cause individuals to accept and make use of systems (adopt the technologies) (King & He, 2006; Venkatesh et al., 2003). One of the longest established and most tested models in the field is the Technology Acceptance Model (TAM). The Technology Acceptance Model has been tested in many empirical research projects (Ajzen, 1985; King & He, 2006; Viswanath Venkatesh & Fred D. Davis, 2000). However, research into technology acceptance specifically in the context of taxation software for use by taxation specialists is very limited, and only McLeod et al., (McLeod & Pippin, 2012; McLeod et al., 2009b; McLeod et al., 2009a; Pippin et al., 2010) could be identified as having published such a study in an established journal.

Both the pilot study and the main study described above empirically support the use of technology acceptance theories in the context of tax technology, and provide additional support for the explanatory power of related models such as the Technology Acceptance Model (Davis et al., 1989) and Augmented Technology Acceptance Model (Taylor & Todd, 1995a).

Research into business level acceptance or organisational adoption of technology as opposed to individual acceptance within an organisation is rare, but not entirely new (Amoako-Gyampah & Salam, 2004; Frambach & Schillewaert, 2002; Theodosiou & Katsikea, 2012; Yu & Tao, 2007). It has been asserted by Yu and Tao (2007) that technology acceptance at the
organisational level has not yet been explored in sufficient detail. The organisational level acceptance study conducted by Autry (2010) has provided some empirical investigation of technology acceptance at an organisational level, but this study could be challenged on the basis that respondents could not in all cases be expected to represent an organisational view.

This research in the context of the main study helps extend the examination of business level acceptance of technology through additional empirical research. In the strong statistical support for the latent variables of Perceived Behavioural Control and Subjective Norm, it provides empirical support for use of the Augmented Technology Acceptance Model (Taylor & Todd, 1995a) in an organisational context. Both those variables relate to strong features of an organisational technology acceptance context, the importance of the views of organisational colleagues, and the dependency on access to relevant organisational resources to enable successful adoption and use of technology.

9.2.2 Contribution to business to business marketing

In relation to business to business purchases of technology, Forman et al. (2007) assert that research into the user’s role in influencing the final buying decisions related to high technology products (such as specialist information technology) has been limited with the exception of Dadzie et al. (1999). Clearly tax technology software would qualify as specialist information technology in this context.
The empirical investigation in the main study considers a unique instance of the above, the situation where the key buyer is also a future user of the technology system. The main study shows directly how the lead tax decision maker (key buyer) attitude to using the tax technology can influence the formation of an intention to buy indirectly through the impact that attitude has on the decision maker’s perception of the tax technology’s value for money. This adds to the body of knowledge in this area and (as explored below) through introducing technology acceptance into a business buying model does so in a novel way.

In addition, the main study contributes to the large body of existing knowledge in relation to the impact of relationship quality in organisational buying. The importance of relationships to marketing and buying processes, particularly in relation to business to business transactions and service industries, is now firmly established (Constantinides, 2006; Ford et al., 2006; Håkansson et al., 2009; Palmatier, 2008).

Whilst the expected relationship between the quality of the relationship between the tax technology buyer and the vendor organisation was rejected by the statistical analysis (see Section 8.2 above), this finding shows that it is not always the case that Relationship Quality is an important factor in buying decisions, and adds to the existing body of empirical studies in this area.
The finding in the modified model (see Section 8.3 above) that Relationship Quality has a positive relationship with Perceived Usefulness as an antecedent of Perceived Usefulness builds on previous research looking at trust (Gefen et al., 2003; Pavlou, 2003) as an antecedent of Perceived Usefulness.

An initial objective of this study was to examine the appropriateness of utilising consumer based theoretical models of intention to buy in a business and organisational context. Specifically, the study sought to show that inclusion of relationship quality in the theoretical model tested, together with other measures, would enable a consumer based model to adequately explain a business buying scenario. Achievement of this objective would provide further empirical support for the assertion that there is a limited distinction in many scenarios between consumer and business buying (Fern & Brown, 1984; Wilson, 2000).

The study has shown how a consumer based buying model (Sweeney et al., 1999) could be successfully used in the context of examining the decision to buy tax technology, despite the lack of support for the importance of relationship quality as a key factor in that decision. This can be seen from the empirical support given to model fit, and the fact that the key variables of Perceived Value for Money and Perceived Relative Price from the Sweeney model had a strong statistically significant relationship with Intention to Buy tax technology (see Section 8.2).
9.2.3 Contribution to a new stream of research in technology marketing

As outlined above, a link between technology acceptance and organisational buying of technology has been empirically evidenced in this study. The link between the two could potentially unlock a new stream of research in relation to business to business marketing of technology.

In the study, this link was achieved by using the latent variable of Attitude to Use from technology acceptance theory as a substitute for the latent variable of Perceived Product Quality in marketing theory. The link between product quality and attitude to use is supported in literature (Holbrook & Corfman, 1985; Olshavsky, 1985; Zeithaml, 1988). However, no previous substitution of Attitude to Use for Product Quality could be seen in the literature.

The success of combining the Augmented Technology Acceptance Model (Taylor & Todd, 1995a) in this way with a marketing model examining buying intention (Sweeney et al., 1999) in this study is evident from the strong statistical support of empirical testing of the structural model (see Section 8.2 above). There is clearly an opportunity in future for far greater empirical research into this type of approach to technology buying in an organisational context.
9.3 Implications for Management

The implications for management can be considered from two perspectives – the buyer and the seller perspective. In general, however, the key finding is that the theorised model shows that a limited number of factors when combined can have a significant influence on the formation of an intention to buy technology in circumstances similar to those seen in this study.

The central finding of this study is that the five key base variables considered in this study can ultimately strongly influence the formation of an intention to purchase technology in a tax (and potentially wider) context. Those five base variables are:

1. Perceived Ease of Use (how easy to use / intuitive the technology appears to be from the point of view of the key buyer)
2. Perceived Usefulness (the degree to it is perceived that the system will improve performance of the key buyer)
3. Perceived Relative Price (the perception of the price relative to that of similar products from the point of view of the key buyer)
4. Subjective Norm (the perception of the key buyer of the views of important colleagues as to whether the technology should be bought)
5. Perceived Behavioural Control (the extent to which the key buyer feels they may or may not be able to buy the technology based on external factors such as resources).
Both Attitude to Use and Perceived Value for Money are not considered as critical base variables since the large majority of variance in those variables is driven by combinations of the above 5 variables. For example 86% of the variance in Attitude to Use is explained by a combination of Perceived Ease of Use and Perceived Usefulness (see Section 8.2).

In actual fact, the empirical results show that a significant proportion of perception of usefulness of technology is, in fact, explained by the perceived ease of use or intuitiveness of that technology, implying that in general terms the intuitiveness of user interfaces for technology should be a key factor in relation to the success both of marketing of technology and subsequent adoption and use of that technology within the buyers organisation.

### 9.3.1 Implications for Management – Seller perspective

From the perspective of a tax technology vendor, the marketing approach of a vendor should be to influence the above key variables where possible in such a way as to increase the key buyer’s intention to purchase the technology.

Taking each in turn:

#### 9.3.1.1 Perceived Ease of Use

The vendor should attempt to make the user interface for a tax technology (or similar technology) as intuitive and simple to use as possible. Ideally, the
interface will be aesthetically pleasing as well. This approach can be seen again and again in relation to design features of consumer technology such as the Apple iPhone. This will have a significant positive impact on the buyer’s perception of the usefulness of the software and help the formation of a positive attitude to the technology/perception of its quality.

9.3.1.2 Perceived Usefulness

The vendor should (in addition to the points raised above) understand the functional requirements of its buyers and the potential ways in which the technology will simplify or enhance the processes carried out by the buyer, then ensure functionality mapping to this should be designed into the technology. In this way, the perceived usefulness of the technology can be increased, which should again lead to the formation of a positive attitude to the technology/perception of its quality.

9.3.1.3 Perceived Relative Price

There is limited new information to convey as a result of this study in relation to this variable, other than the fact that the study confirms the fact relative price is a key factor in determining the value for money of a technology offering.

The important message for vendors is that this is a perceived and a relative price. Therefore, the vendor should focus on stressing all of the unique and
original functionality and components of their offering, to ensure as far as possible that any competitor’s product is seen as not comparable and inferior such that a price differential can be maintained (unless a lowest cost strategy is being undertaken). A lowest cost strategy is unusual in a tax technology market context due to the specialist nature and complexity of the technology and lack of a substantive mass market for individual products in many cases.

9.3.1.4 Subjective Norm

This study demonstrates (at least in a tax technology context) that if the key buyer perceives that his colleagues do not feel the technology should be bought, then the buyer is less likely to form an intention to purchase the technology. This implies that the vendor who is confident in their product should actively seek to engage with and promote the technology to a range of stakeholders in the organisation (who are important to the key buyer) with a view to getting their positive endorsement of it and influencing positively the key buyer where the buyer is not immediately committed to a purchase.

Alternatively, if negative views are being put forward by those close to the key buyer, the vendor must work hard to influence the buyer’s perception of the views of those other individuals, minimising the importance of those views by offering to better explain the offering to those individuals for example.
9.3.1.5 Perceived Behavioural Control

This study demonstrates (at least in a tax technology context) that if the key buyer perceives that he will be unable to get the necessary resources or permissions to buy or use the technology successfully, then the buyer is less likely to form an intention to purchase the technology. From a vendor’s perspective, it is critical to identify any potential concerns as early as possible in relation to these constraints, and modify either the marketing approach or the way the offering is packaged accordingly.

For example, if the buyer perceives that he or she will not be able to get access to internal IT resources to deploy the software on their infrastructure, then the vendor might be able to offer to ‘host’ the software on the vendor organisation’s infrastructure and make the technology available over the Internet to the buyer’s users, effectively bypassing the buyer’s internal IT/Infrastructure problem.

9.3.2 Implications for Management – Buyer perspective

From the perspective of a tax technology buyer, the approach should be to ensure that the process of buying tax technology software should be structured, rigorous and methodological as far as possible. This is because the above variables can act as simplifying mental heuristics and biases in the mind
of a buyer (see Section 2.2.3 above), and cause an important factor in decision making to be potentially overlooked. Taking each variable in turn:

### 9.3.2.1 Perceived Ease of Use

The buyer should still look for technology where the user interface for the technology is as intuitive and simple to use as possible, simply on the basis that this will aid organisational adoption of the technology as described above. This will have a significant positive impact on the potential user’s perceived usefulness of the software and help the formation of a positive attitude to the technology/perception of its quality.

However, the buyer should also take care to ensure that the user interface is not overemphasized in the evaluation of the technology and a sound methodology for scoring competing technologies is identified in advance to prevent the risk of over simplified or biased decision making in relation to the quality of the software.

### 9.3.2.2 Perceived Usefulness

The buyer should (in addition to the points raised above) understand its key functional requirements and the potential ways in which the technology will simplify or enhance the (tax) processes carried out by his or her organisation, then ensure in a systematic way that functionality meeting these requirements can be delivered by the technology. In this way, the perceived usefulness of
the technology can be increased, which should again lead to the formation of a positive attitude to the technology/perception of its quality in the minds of potential users aiding adoption.

However, the buyer should also take care to ensure that the analysis of functionality in the software is not oversimplified and is subjected to testing to minimize the risk of perception not equating to reality. A sound methodology for scoring competing technologies is identified in advance to prevent the risk of over simplified or biased decision making in relation to the quality of the software.

9.3.2.3 Perceived Relative Price

There is limited new information to convey as a result of this study in relation to this variable, other than the fact that the study confirms the fact relative price is a key factor in determining the value for money of a technology offering.

The important message for buyers (as for vendors) is that this is a perceived and a relative price. Therefore the buyer should try to ensure as far as possible that all competing products are analysed systematically. This should allow any necessary differentiation between competing products in terms of functionality or in terms of the wider offering (such as service contracts
embedded in the price) before concluding on whether prices are actually for similar products.

Additionally, the whole cost of implementation of the software should be considered as part of the above. One technology product may have greater support requirements or require additional effort outside of the technology when combined with the processes it is supporting than another. For this reason, the internal cost may be higher even though the vendor cost is lower.

9.3.2.4 Subjective Norm

This study demonstrates (at least in a tax technology context) that if the key buyer perceives that his colleagues do not feel the technology should be bought, then the buyer is less likely to form an intention to purchase the technology. Equally, if the buyer perceives that his colleagues feel the technology should be bought, then he is more likely to form that intention. The buyer should address the risk of over simplified or biased decision making by key individuals impacting on the decision in relation to the technology. He or she can do this by involving all important stakeholders in a formal and methodological decision making process.

9.3.2.5 Perceived Behavioural Control

This study demonstrates (at least in a tax technology context) that if the key buyer perceives he will be unable to get the necessary resources or
permissions to buy or use the technology successfully, then the buyer is less likely to form an intention to purchase the technology.

The buyer should firstly recognise this may only be a perception and not reality, and should methodologically investigate all potential barriers or external constraints. The buyer should recognise that vendors may well be able to help modify the way the technology offering is packaged to assist management of these barriers as described in Section 9.3.1.5 above.

9.4 Limitations and Future Research

The key limitations of this research fall into two main categories, consequences of small sample size, and narrowness of context. In both cases, examination of the limitations points to future research opportunities that could and should be explored. The two categories are examined below.

9.4.1 Small sample size

As outlined in detail in Chapter 6, difficulties were faced in obtaining a sufficiently large sample size to allow statistical power to be obtained in relation to Structural Equation Modelling. As a consequence two limitations of this study were introduced

1. Latent variables in relation to Perceived Risk and Perceived Service Quality were dropped from the structural model, and
2. It became impossible to retain sufficient statistical power to conduct any group analysis in relation to key demographic and control data.

Based on the literature review, both decrease in Perceived Risk and increase in Perceived Service Quality can result in an increase in Perceived Value for Money (Sweeney et al., 1999). Whilst in the review of the structural model in the main study it was found that 60% of variance in Perceived Value for Money was explained by the latent variables Attitude to Use and Perceived Relative Price, clearly additional variance could have been accounted for had these additional variables been part of the model. In particular it may be the case that Perceived Risk would have added explanatory value based on Sweeney et al. (1999) findings.

For this reason, an enlarged model containing these two additional latent variables is one opportunity for future research to supplement the empirical contribution made by this study. This would require a larger sample size which could potentially prove challenging in the context of tax technology.

In relation to demographic and control data, several alternative analyses of the model based on groups identified from that data could have been performed if a much larger sample size had been obtained. The different characteristics that could have been analysed are as follows:
1. Gender of respondent
2. Age of respondent
3. Geographic location of respondent
4. Organisation size by turnover
5. Organisation size by tax function headcount
6. Type of technology considered (and classes for example web based v non-web based)
7. Analysis by industry
8. Analysis by role of procurement (involved / not involved)

For this reason, further similar empirical studies with a significantly larger sample size could be conducted which incorporate group analysis, segmenting respondents in line with the 8 factors outlined above. However this would require an order of magnitude larger data set which may not be feasible in the context of tax technology, where, for example, there is no established survey panel available. A choice of similar technology bought by other senior organisation functional leads might make a greater sample size possible (for example an HR director respondent set).

9.4.2 Narrowness of context
This study was conducted in a finely selected context – that of the buying of tax technology. This context is potentially quite narrow in the context of
applying findings from the study more widely to all forms of technology purchase. The reasons for this are two-fold:

1. The tax technology context allows clear identification of a single lead buyer in the organisation (as opposed to a more clearly group based decision making scenario).

2. The tax technology context typically has less formality and less involvement of procurement than in many other technology acquisition scenarios.

Despite the above comments, there are, however, similar non tax technology buying scenarios that could be considered as extensions to this stream of research where similar context might apply. In such cases, as noted above, it may be far easier to obtain a larger sample size in those other scenarios. The example of HR technology acquisitions (led by the HR director) was stated above. Another would be company secretarial software, where the Company Secretary is likely to perform a role analogous to that of the Tax Director in this study. These are specific areas where the model in this research could be applied and further empirical investigation undertaken.

In general terms, it remains open to question whether intention to buy more general or larger value technology or software in an organisation context would be explained by a model of the type deployed in this study, which
utilises technology acceptance theory. There is a clear opportunity for further research to be undertaken to explore this potential new line of attack.

9.5 Personal learning and development

The experience of developing the skills required of an academic researcher has been richly rewarding. Learning how to conduct research was an important objective when embarking on the doctoral program supporting this study. Some aspects of this process have been easier than others. Learning to write in an academic style, as opposed to a business style, has been a continuing challenge. Also, developing the skills to narrow the search through potentially relevant material using the quality of source and number of citations as a guide has been a long journey.

The main personal challenge faced during this research was the incredible difficulty of getting sufficient reliable empirical data for the main study, as articulated in Chapter 6 above. With hindsight, a critical and pessimistic analysis of potential data sources and approaches to critical data collection should form part of the formation a research topic and determination of the research objectives. It should also potentially shape the context and nature of the research questions addressed. Certainly, in relation to quantitative data, careful consideration should be given to extant data sources such as corporate
databases, or available panels, before embarking on significant research projects.

Personal learning achieved in relation to epistemology and research methodologies has been applied into the work environment, and this has helped development of personal skills in a business context. Examples are the work undertaken to prepare supporting data for complex business cases, and methodologies for problem solving deployed in the context of working within steering groups and innovation panels.

The subject matter of this study has been directly relevant to the Researcher’s work. The Researcher is a tax partner in a major accounting organisation working in the area of tax technology. He designs and builds then sells such technology to clients, helps clients to build their own tax technology solutions in house, and advises clients on what third party tax technologies to buy. The research undertaken here is dealing with subject matter and principles that are engaged with everyday. The findings of this study and in particular the managerial implications described above are confirmed by the Researcher’s working reality. For example, a focus on intuitive and attractive user interfaces
is core to design principles utilised when the Researcher’s organisation develops tax technology, reflecting the importance of Perceived Ease of Use.

9.6 Conclusion

In summary, this study developed a research model, bringing together business marketing and technology acceptance, to examine the business buying of tax technology. This research adopted a quantitative approach to testing the theoretical model, which appeared to provide strong empirical support for its effectiveness in examining the antecedents of the formation of an intention to buy tax technology. There is wide scope for additional research in relation to business buying of technology that takes further this empirical investigation and examines the link between technology acceptance and business buying further.
APPENDIX A

Pilot Study Questionnaire

Thank you for agreeing to take this short survey. Please ensure before completing this survey you have

1. Logged on to the Internet at https://itwh.pwc.com/ and signed on using your user name and password.
2. Used the Web-site to search for commentary on the 2006 European Court of Justice (ECJ) judgement in a VAT case involving Halifax plc.

The responses made will be treated as completely confidential and form part of an overall statistical analysis only.

1. Please state your gender

☐ Male
☐ Female

2. Please indicate your relevant age group

☐ <30
☐ 30 - 39
☐ 40 - 50
☐ 50 - 60

3. Do you use alternative sites similar to ITWH?

☐ Yes
☐ No

4. Getting the information I want from itwh is easy

*Please respond to the above statement by selecting the appropriate choice below.
Select at least one and no more than one.*
5. **Becoming skillful at using the itwh site was difficult**  
*Please respond to the above statement by selecting the appropriate choice below. Select at least one and no more than one.*

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Somewhat disagree
- [ ] Neutral
- [ ] Somewhat agree
- [ ] Agree
- [ ] Strongly agree

6. **Learning to use itwh is easy**  
*Please respond to the above statement by selecting the appropriate choice below. Select at least one and no more than one.*

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Somewhat disagree
- [ ] Neutral
- [ ] Somewhat agree
- [ ] Agree
- [ ] Strongly agree
7. **itwh improves my performance in tax research**
*Please respond to the above statement by selecting the appropriate choice below. Select at least one and no more than one.*

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Somewhat disagree
- [ ] Neutral
- [ ] Somewhat agree
- [ ] Agree
- [ ] Strongly agree

8. **itwh does not enhance my effectiveness in tax research**
*Please respond to the above statement by selecting the appropriate choice below. Select at least one and no more than one.*

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Somewhat disagree
- [ ] Neutral
- [ ] Somewhat agree
- [ ] Agree
- [ ] Strongly agree
9. *itwh increases my productivity in searching for indirect tax information*

Please respond to the above statement by selecting the appropriate choice below.
Select at least one and no more than one.

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Somewhat disagree
- [ ] Neutral
- [ ] Somewhat agree
- [ ] Agree
- [ ] Strongly agree

10. *I am very likely to use the itwh website in future*

Please respond to the above statement by selecting the appropriate choice below.
Select at least one and no more than one.

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Somewhat disagree
- [ ] Neutral
- [ ] Somewhat agree
- [ ] Agree
- [ ] Strongly agree

11. *I predict that I will not use itwh website in future*

Please respond to the above statement by selecting the appropriate choice below.
Select at least one and no more than one.

- [ ] Strongly disagree
12. **Given I have access to it, I will use it**

*Please respond to the above statement by selecting the appropriate choice below. Select at least one and no more than one.*

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Somewhat disagree
- [ ] Neutral
- [ ] Somewhat agree
- [ ] Agree
- [ ] Strongly agree

13. **PwC is not a reliable source of tax information**

*Please respond to the above statement by selecting the appropriate choice below. Select at least one and no more than one.*

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Somewhat disagree
- [ ] Neutral
- [ ] Somewhat agree
- [ ] Agree
- [ ] Strongly agree
14. **PwC will have accurate and meaningful insights into tax changes and developments**

*Please respond to the above statement by selecting the appropriate choice below. Select at least one and no more than one.*

- □ Strongly disagree
- □ Disagree
- □ Somewhat disagree
- □ Neutral
- □ Somewhat agree
- □ Agree
- □ Strongly agree

15. **PwC is a recognised leading professional services firm**

*Please respond to the above statement by selecting the appropriate choice below. Select at least one and no more than one.*

- □ Strongly disagree
- □ Disagree
- □ Somewhat disagree
- □ Neutral
- □ Somewhat agree
- □ Agree
- □ Strongly agree

16. **PwC does not have a good reputation in the marketplace**

*Please respond to the above statement by selecting the appropriate choice below.*
Select at least one and no more than one.

☐ Strongly disagree
☐ Disagree
☐ Somewhat disagree
☐ Neutral
☐ Somewhat agree
☐ Agree
☐ Strongly agree
APPENDIX B

Main Study Questionnaire

Tax Technology Buying Intention Survey - Current

Q1 Please consider a tax technology offering from a single supplier (such as a tax software tool, web service or application) which you are currently evaluating or considering for use in your tax function. It is important that you respond in relation to a current evaluation process. If you are not currently evaluating a tax technology offering (i.e. have already made a decision), please answer no to the question that follows. Thank you for participating in this survey.

Q1A Are you currently considering a tax technology offering
   ☐ YES (1)
   ☐ NO (2)

If NO Is Selected, Then Skip To End of Survey

Q2 Which of the following categories best describes the tax technology you are considering
   ☐ Web based information tracking or collaboration (1)
   ☐ Web based data gathering tool (2)
   ☐ Web based calculation tool (3)
   ☐ Web based data analysis tool (4)
   ☐ Server or PC based data gathering tool (5)
   ☐ Server or PC based information tracking or collaboration tool (6)
   ☐ Server or PC based calculation tool (7)
   ☐ Server or PC based data analysis tool (8)
   ☐ Other (9)
Q3 Please describe the tax technology you are considering

Q4 What is your gender?
   - Male (1)
   - Female (2)

Q5 What is your age in years?
   - Under 30 (1)
   - 30 to under 40 (2)
   - 40 to under 50 (3)
   - 50 or over (4)

Q6 How large is your tax function globally in full time equivalent headcount?
   - Less than 10 (1)
   - 10 to less than 30 (2)
   - 30 to less than 50 (3)
   - 50 or more (4)

Q7 What industry best describes your organisation from the choices below?
   - Financial Services (1)
   - Consumer products and retail (2)
   - Industrial products or manufacturing (3)
   - Telecommunications (4)
   - Entertainment and Media (5)
   - Legal or professional services (6)
   - Pharmaceuticals or chemicals (7)
   - Public sector (8)
   - Hospitality or business services (9)
   - Other (10)

Q8 Please describe the industry group applicable to your organisation
Q9 How large is your organisation globally as measured by turnover?
- Less than £100m (1)
- £100m to less than £500m (2)
- £500m to less than £1bn (3)
- £1bn to less than £5bn (4)
- £5bn or more (5)

Q10 Is your procurement function involved in the decision to purchase tax technology?
- No (0)
- Yes (1)

PVM1 Please respond to the following:

<table>
<thead>
<tr>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>This technology offering is good value for money</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
<td>☐</td>
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PVM2 Please respond to the following:

<table>
<thead>
<tr>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>This technology offering is a good buy</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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PVM3 Please respond to the following:

<table>
<thead>
<tr>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
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</thead>
<tbody>
<tr>
<td>At the price quoted the technology offering is economical</td>
<td>☐</td>
<td>☐</td>
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</table>
PSQ1 Please respond to the following:

<table>
<thead>
<tr>
<th>The team supporting the technology offering had the knowledge to answer my questions</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
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<td>●</td>
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</table>

PSQ2 Please respond to the following:

<table>
<thead>
<tr>
<th>The team supporting the technology offering knew what they were talking about</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
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</table>

PSQ3 Please respond to the following:

<table>
<thead>
<tr>
<th>The team supporting the technology offering were willing to help me</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
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PR1 Please respond to the following:

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<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
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<tbody>
<tr>
<td>This technology offering is NOT risky in terms of how it might perform</td>
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PR2 Please respond to the following:

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<thead>
<tr>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>This technology will NOT be expensive to operate and maintain</td>
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PR3 Please respond to the following:

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<tr>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is a no real chance this technology will NOT work properly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PRP1 Please respond to the following:

<table>
<thead>
<tr>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The price of this technology is low relative to other technology offerings with similar features</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PRP2 Please respond to the following:

<table>
<thead>
<tr>
<th></th>
<th>Very high (1)</th>
<th>High (2)</th>
<th>Somewhat high (3)</th>
<th>Neither high nor low (4)</th>
<th>Somewhat Low (5)</th>
<th>Low (6)</th>
<th>Very low (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>How would you rate the price of this technology offering relative to other technology offerings with similar features</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

PRP3 Please respond to the following:

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The price of this technology is reasonable when compared to similar technology offerings</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

ITB1 Please respond to the following:

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would consider buying this technology offering from this organisation</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
### ITB2 Please respond to the following:

<table>
<thead>
<tr>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There is a strong likelihood that I will buy this technology offering</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

### ITB3 Please respond to the following:

<table>
<thead>
<tr>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am very likely to purchase this technology offering</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

### RQ1 Please respond to the following:

<table>
<thead>
<tr>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We are willing “to go the extra mile” to work with the organisation providing the technology offering</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

### RQ2 Please respond to the following:

<table>
<thead>
<tr>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We view the relationship with the organisation providing the technology offering as a long-term partnership.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

269
<table>
<thead>
<tr>
<th>RQ3 Please respond to the following:</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>We have trust in this organisation providing the technology offering.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RQ4 Please respond to the following:</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The organisation providing the technology offering is trustworthy</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RQ5 Please respond to the following:</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is an expectation of reciprocity guiding our relationship with the organisation providing the technology offering</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>
RQ6 Please respond to the following:

<table>
<thead>
<tr>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>We (my organisation and the organisation providing the technology offering) would help each other without expecting an immediate favour in return.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

RQ7 Please respond to the following:

<table>
<thead>
<tr>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our dealings with the organisation providing the technology offering are very efficient.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

PEOU1 Please respond to the following:

<table>
<thead>
<tr>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I find the technology clear and understandable.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>
PEOU2 Please respond to the following:

<table>
<thead>
<tr>
<th>Interaction with the technology would not require a lot of mental effort.</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

PEOU3 Please respond to the following:

<table>
<thead>
<tr>
<th>I would find it easy to get the technology to do what I want it to do</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

PU1 Please respond to the following:

<table>
<thead>
<tr>
<th>Using the technology would improve the productivity of our tax function</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

PU2 Please respond to the following:

<table>
<thead>
<tr>
<th>I feel the technology would be useful in our tax function</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>
PU3 Please respond to the following:

<table>
<thead>
<tr>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using the technology would improve the effectiveness of our tax function</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
</tbody>
</table>

ATU1 Please respond to the following:

<table>
<thead>
<tr>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All things considered, using the technology in the tax function would be good</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
</tbody>
</table>

ATU2 Please respond to the following:

<table>
<thead>
<tr>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All things considered, using the technology in the tax function would be wise</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
</tbody>
</table>
ATU3 Please respond to the following:

<table>
<thead>
<tr>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All things considered, using the technology in the tax function would be favourable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ATU4 Please respond to the following:

<table>
<thead>
<tr>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All things considered, using the technology in the tax function would be beneficial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ATU5 Please respond to the following:

<table>
<thead>
<tr>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All things considered, using the technology in the tax function would be positive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### SN1 Please respond to the following:

<table>
<thead>
<tr>
<th>People who influence my behaviour think we should use the technology</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### SN2 Please respond to the following:

<table>
<thead>
<tr>
<th>People who are important to me think we should use the technology</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### SN3 Please respond to the following:

<table>
<thead>
<tr>
<th>Fellow members of the tax function whose views I respect think we should use the technology</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PBC1 Please respond to the following:</td>
<td>Strongly Disagree (1)</td>
<td>Disagree (2)</td>
<td>Somewhat Disagree (3)</td>
<td>Neither Agree nor Disagree (4)</td>
<td>Somewhat Agree (5)</td>
<td>Agree (6)</td>
<td>Strongly Agree (7)</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>-----------------------</td>
<td>---------------</td>
<td>------------------------</td>
<td>-------------------------------</td>
<td>-------------------</td>
<td>-----------</td>
<td>-------------------</td>
</tr>
<tr>
<td>I have control over whether we use the technology</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PBC2 Please respond to the following:</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have the resources necessary to use the technology</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PBC3 Please respond to the following:</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The system is NOT incompatible with other systems I use</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
APPENDIX C

Example covering email for main survey questionnaire

One of my close colleagues is working in his own time towards a doctorate at the Manchester Business School. The Financial Times recently ranked Manchester Business School in the top 30 schools in the world, and number 1 for Research. He is working with two professors of marketing at the Business School - Peter Naude and Stephan Henneberg. Both are leading academics in their field.

This study is investigating how individuals and groups make decisions on adoption and purchase of technology tools and offerings for use within a tax function.

In order to progress his studies my colleague needs to collect sample data. This is to be achieved through questionnaires, data from which will enable statistical Modelling of the importance of various factors in the adoption and buying decisions in relation to technology, looking at factors like risk, service, ease of use, functionality, price, views of peers, perceived organisational constraints etc.
I would be really grateful if you would be prepared to complete the survey, which is completely anonymous and confidential, and which should take absolutely no more than 5-10 minutes, and can be accessed here:

http://mbs.qualtrics.com/SE/
APPENDIX D

Lisrel Syntax Main Study

TI Final Structural Model
Covariance Moment Matrix
Maximum Likelihood Estimator
Assymptotic Covariance Matrix
!DA NI=33 NO=125 MA=CM
SY="D:\DBA\SEM\DBA\FINAL1\FINAL1.dsf" NG=1
!AC FI="D:\DBA\SEM\DBA\FINAL1\FINAL1.acm"
SE
20 21 22 23 24 25 26 27 1 2 3 7 8 9 28 29 30 31
32 33 17 18 19 4 5 6 10 11 12 13 14 15 16 /
MO NX=19 NY=14 NK=5 NE=4 BE=FU GA=FI PS=SY TE=SY TD=SY LE
PU ATU PVM ITB
LK
SN PBC PEOU RQ PRP
FR LY(2,1) LY(3,1) LY(5,2) LY(6,2) LY(7,2) LY(8,2) LY(10,3) LY(11,3)
LY(13,4)
FR LY(14,4) LX(2,1) LX(3,1) LX(5,2) LX(6,2) LX(8,3) LX(9,3) LX(11,5)
LX(12,5)
FR LX(14,4) LX(15,4) LX(16,4) LX(17,4) LX(18,4) LX(19,4) BE(2,1)
BE(3,2) BE(4,1)
FR BE(4,3) GA(1,3) GA(2,3) GA(3,5) GA(4,1) GA(4,2) GA(4,4)
VA 1 LY(1,1)
VA 1 LY(4,2)
VA 1 LY(9,3)
VA 1 LY(12,4)
VA 1 LX(1,1)
VA 1 LX(4,2)
VA 1 LX(7,3)
VA 1 LX(10,5)
VA 1 LX(13,4)
PD
PSFfile FINAL1.psf
OU MA=FINAL1.mas EC=FINAL1.ecs RM=FINAL1.rms SI=FINAL1.sis
GF=FINAL1.gfs C
PV=FINAL1.pfs SV=FINAL1.svs TV=FINAL1.tvs ER
APPENDIX E

Lisrel Syntax Main Study Modified

TI Finalmod
!DA NI=33 NO=125 MA=CM
SY='D:\DBASEM DBA\FINALMOD\Finalmod.dsF' NG=1
!AC FI='D:\DBASEM DBA\FINALMOD\finalmod.acm
SE
  1 2 3 20 21 22 24 25 26 27 7 8 9 4 5 6 17
18 19 28 29 30 10 11 12 13 14 15 16 31 32 33 /
MO NX=19 NY=14 NK=5 NE=4 BE=FU GA=FI PS=SY TE=SY TD=SY LE
PU ATU PVM ITB
LK
PEOU RQ SN PBC PRP
FR LY(2,3) LY(3,3) LY(5,1) LY(6,1) LY(8,2) LY(9,2) LY(10,2) LY(11,2) LY(13,4)
FR LY(14,4) LX(2,5) LX(3,5) LX(5,1) LX(6,1) LX(8,3) LX(9,3) LX(11,2) LX(12,2)
FR LX(13,2) LX(14,2) LX(15,2) LX(16,2) LX(18,4) LX(19,4) BE(2,1) BE(3,2) BE(4,1)
FR BE(4,3) GA(1,1) GA(1,2) GA(2,1) GA(3,5) GA(4,3) GA(4,4)
VA 1 LY(1,3) 
VA 1 LY(4,1) 
VA 1 LY(7,2) 
VA 1 LY(12,4) 
VA 1 LX(1,5) 
VA 1 LX(4,1) 
VA 1 LX(7,3) 
VA 1 LX(10,2) 
VA 1 LX(17,4) 
PD
PSFfile Finalmod
OU MA=Finalmod.mas EC=Finalmod.ecs RM=Finalmod.rms
SI=Finalmod.sis GF=Finalmod.gfs C
PV=Finalmod.pfs SV=Finalmod.svs TV=Finalmod.tvs ER
APPENDIX F

Lisrel Syntax Pilot Study

TI ITWH no BRAND
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SE
9 8 7 4 5 6 1 2 3 /
MO NX=3 NY=6 NK=1 NE=2 BE=FU GA=FI PS=SY TE=SY TD=SY
LE
IU PU
LK
PEOU
FR LY(1,1) LY(2,1) LY(3,1) LY(4,2) LY(5,2) LY(6,2) LX(1,1) LX(2,1) LX(3,1)
FR BE(1,2) GA(1,1) GA(2,1)
PD
OU
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