An Essay about the Effect of Vague Accounting Standards on the Decision Making Process of Auditors

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ABSTRACT

Vague words and expressions are present throughout the standards that comprise the accounting and auditing professions. Vagueness is considered to be a significant source of inexactness in many accounting decision problems and many authors have argued that the neglect of this issue may cause accounting information to be less useful. On the other hand, we can assume that the use of vague terms in accounting standards is inherent to principle based standards (different from rule based standards) and that to avoid vague terms, standard setters would have to incur excessive transaction costs. Auditors are required to exercise their own professional judgment throughout the audit process and it has been argued that the inherent vagueness in accounting standards may influence their decision making processes. The main objective of this paper is to analyze the decision making process of auditors and to investigate whether vague accounting standards create a problem for the decision making process of auditors, or lead to a better outcome. This paper makes the argument that vague standards prompt the use of System 2 type processing by auditors, allowing more comprehensive analytical thinking; therefore, reducing the biases associated with System 1 heuristic processing. If our argument is valid, the repercussions of vague accounting standards are not as negative as presented in previous literature, instead they are positive.
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1. INTRODUCTION

Vagueness is the characteristic of an object, word, or concept related to an insufficient delineation of its meanings’ boundaries, created by linguistic imprecision, factual uncertainty, or both. Vagueness has been argued to be a significant source of inexactness in many accounting decision problems and the neglect of this issue may cause accounting information and analysis to be less useful (Zebda, 1991). Accounting is considered to be undeniably imprisoned with technical and conceptual vagueness. According to Penno (2008) the accounting framework is based on rules and like any other rule-based system the problem of vagueness perseveres; therefore, decisions cannot be objectively described as right or wrong, but instead will be based on an authority’s judgment.

According to Zebda (1991) many accounting problems include ambiguous states of nature and vague criteria and constraints, both of which are inherently vague in the sense that they involve concepts that defy binary classification and violate the Law of Excluded Middles, which is assumed by accounting and auditing decision models. Cardoso and Aquino (2009b) indicated that the ignorance of vagueness in asset classification may result in arbitrary classification of assets, which may produce misleading information for financial statement users. In the study performed by Cardoso and Aquino (2009b) the alleged vagueness between the concepts of inventory, property, plant and equipment (PPE), and intangible assets was investigated. The results of the study revealed that Masters of Business Administration (MBA) students acknowledged the vagueness and identified the weakly defined boundaries between inventory, PPE and intangible assets.

The vagueness in accounting and auditing may influence accounting and auditing decisions. It is believed by many theorists that any conceptual framework in accounting must acknowledge vagueness and that this vagueness has a negative effect on the decision making process of accountants and auditors (Zebda, 1991).

There are a number of theories that have been developed in an attempt to understand the decision making process of individuals. The expected utility theory is amongst one of the most
dominant theories in microeconomics. Over the past years, researchers have proposed many alternative theories to the expected utility theory; however, these theories were not capable of accommodating the problem of ambiguity in decision making (Zebda, 1991). The decision making process of auditors is important to understand because auditors are required to exercise their own personal judgment on a daily basis, which can have a significant impact on the quality and accuracy of accounting information.

Judgment is pervasive in auditing and is required in all stages of the process, which includes stages such as establishing materiality, assessing sources and types of risk, selecting substantive audit procedures, along with numerous others. Auditing involves judgment and audit decisions require effective judgment by individual professionals. Generally, the evidence available to the auditor is subjective, non-quantitative, and potentially ambiguous; therefore, the quality of an auditor’s judgment and decision process has a direct impact on the quality of audit outcomes (Knechel, 2000).

The necessity of auditors possessing high levels of judgment and decision skills is becoming more important as the business environment becomes increasingly complex, international, networked, and dynamic. By explicitly recognizing and understanding the aspects of an auditor’s professional judgment, needs for improvement can be recognized and encouraged (Knechel, 2000).

There are many factors and constraints that affect the decision making process of auditors, including personal ethics and cognitive limitations. Each individual has their own set of principles and moral values, which influences their decisions and may cause different auditors to react dissimilarly in the same situations (Knechel, 2000). Bounded rationality, which is discussed in a subsequent section, refers to theories of decision making that takes into consideration the decision process and the actual capacities and limitations of the human mind.

Researchers have made a distinction between two different types of cognitive processes, System 1 and System 2. This dual process theory of thinking has contributed to explaining individuals’ rational thinking failures. It is important to examine the two different systems to determine why and in what specific situations each system will be employed in judgment;
therefore, enabling a more accurate prediction of when each system will be engaged. The human decision making process can be better understood by determining in what situation each system is engaged because each processing system may result in different decisions by the individual.

This paper attempts to create a link between the decision making process of auditors, System 2 processing, and vagueness in the accounting profession. The main objective of this paper is to analyze the decision making process of auditors and to investigate whether vague accounting standards create a problem for the decision making process of auditors.

The focus of the paper is the decision making process of auditors. There are numerous benefits of studying experts in judgment and decision making research. Researchers are highly interested in studying domain specialists and are interested in exploring how they make decisions. The study of experts can establish a generality when similar results are found; therefore, presenting a strong case for the universality of the behaviour (Shanteau & Stewart, 1992). Due to the complexity of modern society, individuals are forced to depend on the judgments and decisions of experts; therefore, increasing the importance of understanding the decision making process of auditors.

The following section provides a review of previous literature related to this paper and has been segregated into four main sections. The first section discusses asset classification and the purpose of accounting information. The next section explores vagueness and the accounting profession, which includes a discussion related to the different types of vagueness, vagueness in accounting, the liquidity paradox, the gray zone, and real life examples of transactions that occur in the gray zone. The third section is related to auditors, which includes a discussion regarding the role of auditors, incentives that influence auditors, audit quality, auditor independence, and auditor size. The final section of the literature review discusses the decision making process, which includes topics relating to rational choice theory and the associated criticisms, bounded rationality, dual system processing, and computational models of analogy making. The literature review is followed by a section discussing the decision making process of auditors and includes an investigation into whether or not vague accounting standards create a
problem in accounting and auditing settings. This section is concluded by a proposed research design and associated research questions. The final section provides a conclusion and general overview to summarize the main points and discussions of the paper.
2. LITERATURE REVIEW

This section has the purpose of presenting a theoretical framework of previous research that is related to this thesis. This section has been divided into four main sections: (i) asset classification and the purpose of accounting information, (ii) vagueness and the accounting profession, (iii) auditors, and (iv) the decision making process.

2.1. ASSET CLASSIFICATION AND THE PURPOSE OF ACCOUNTING INFORMATION

Accounting information is useful to present and potential investors and creditors in making investment, credit, and other similar resource allocation decisions. External users are unable to directly identify the actions of management that occur within the organization; therefore, accounting information provides them with information regarding the financial position, performance and cash flow of the entity. This section provides a brief outline of the main purposes and benefits of accounting information, in addition to an overview of the statement of financial position and the criteria used for asset classification.

Purpose of Accounting Information

Paragraphs 8.6 and 8.7 of the international financial reporting standards (IFRS) for Small and Medium-sized Entities (SMEs) (IASB, 2009d, p. 42) says, respectively: “An entity shall disclose [...] the judgments [...] that management has made in the process of applying the entity’s accounting policies and that have the most significant effect on the amounts recognized in the financial statements” and “An entity shall disclose [...] the key assumptions concerning the future, and other key sources of estimation uncertainty at the reporting date [...].” Managers and accountants are required to make numerous judgemental decisions, which include: choosing appropriate accounting policies, making suitable accounting estimates, and deciding what information should be disclosed in the notes and the financial statements. In order for
practitioners to exercise personal judgements, there must be a set of criteria against which to measure the suitability of alternatives and these fundamental criteria are the objectives of financial reporting for entities (Beechy & Conrod, 2005).

Paragraph 2.2 of the IFRS for SMEs (IASB, 2009d, p. 15) says: “The objective of financial statements of an entity is to provide information about the financial position, performance and cash flows of the entity that is useful for economic decision-making by a broad range of users who are not in a position to demand reports tailored to meet their particular information needs”. These statements must convey information that will be beneficial in the decision making process of a wide range of individuals. The application of accounting rules will generate information that can assist users in determining the most profitable course of action (Carruthers, 1995).

The usefulness of accounting information is determined by the relevance and the reliability of the information. The relevance of accounting information is a function of the choice of economic constructs recognized or disclosed in the statements and notes, and the choice of measurement attributes used to measure these economic constructs. Reliable accounting information indicates that the information is reasonably free from error and bias, and faithfully represents what it purports to represent (Maines & Wahlen, 2006). There is often a trade-off between relevance and reliability, which is a fundamental financial accounting concern (Dye & Sridhar, 2004). Decisions must be made with regards to issues such as, what valuation base should be used in the presentation of the accounting data, what data to recognize in the financial statements and what information to disclose in the notes, and choosing the timeliness of the data to be disclosed in the financial statements.

According to Beechy and Conrod (2005), financial statements have both direct and indirect economic impacts for the enterprise and its stakeholders. For example, direct economic impacts may include:

- reported earnings utilized as the basis for employee profit sharing and/or bonuses;
- reported earnings utilized as the basis for stockholders’ dividends;
- accounting methods may increase or decrease an entity’s income tax liability;
- reported account receivables and inventories may affect the level of finance provided by banks;
- various reported numbers in financial statements may trigger a default on loan requirements (covenants); and
- earnings/price and the entity’s book value are some of the accounting based inputs for asset pricing models.

The financial statements may influence a user’s perception of the enterprise and therefore may affect their relationship with the enterprise. Examples of indirect economic impacts may include:

- lenders evaluate the cash flow potential of a borrower to assess the ability of the borrower to repay the loan;
- income tax authorities evaluate the financial statements to see whether the information that an entity is reporting to its owners is equivalent to the information that a corporation is reporting to the tax authorities;
- employees evaluate an employers’ ability to pay higher compensation;
- shareholders assess managements’ ability to conduct the affairs of the enterprise; and
- security analysts evaluate public companies’ performance and issue recommendations to buy, hold or sell shares.

Accounting information and the financial statements are important resources for investors to assess the financial status of an entity; however, with the emergence of multinational corporations and organizations, the demand has increased for a single set of high quality accounting standards that can be used globally (Kennedy, Kennedy & Olinsky, 2010). Different accounting standards have been developed over the years at the national level; therefore, there is a number of different accounting practices utilized throughout the world. The differences in accounting policies of entities make comparison of financial statements across national boundaries difficult, thus, increasing the necessity for international accounting standards.
International standards are developed by the International Accounting Standards Board (IASB), which is an independent accounting standard-setting body reorganized in 2001. International standards issued prior to the reorganization are known as international accounting standards (IAS), whereas, standards issued after the reorganization are known as international financial reporting standards (IFRS). The IASB has no authority to require companies to use international standards, as this is the jurisdiction of the security exchanges and security regulators in each country. However, international standards are in widespread use and the majority of stock exchanges around the world accept financial standards based on international standards for foreign listed companies.

There are generally four different financial statements: balance sheet (statement of financial position – SOFP), income statement (statement of comprehensive income or statement of financial performance), statement of retained earnings (statement of changes in equity), and statement of cash flows. The following section will only provide an overview of the SOFP, with a specific focus on asset classification, as this statement is the most relevant to this thesis.

The Statement of Financial Position and Asset Classification

The objective of financial statements is to communicate information that is useful to investors, members, contributors, creditors, and many other users, who are not in a position to demand reports tailored to their needs, in making their resource allocation and investment decisions.

The SOFP provides a summary of an entity’s assets, liabilities and equity at a specific point in time. The SOFP provides information about certain actions and strategies of the entity over the year and also reflects liquidity, which is often evaluated with reference to working capital (current assets less current liabilities) or the current ratio (current assets divided by current liabilities). Liquidity provides confirmation of an entity’s ability to pay short term debts from its current assets, as well as the entity’s ability to meet short term and long term obligations, which is a major concern for financial statement users. Creditors are obviously interested in assessing the liquidity of an entity because debt repayments are influenced by the liquidity of
an entity. Additionally, equity investors are also interested in the liquidity of an entity because liquidity problems may constrain dividend payments. Unions consider liquidity to establish bargaining positions and employees are concerned with the entity’s continuing ability to pay wages (Beechy & Conrod, 2005).

Economic constructs are classified into accounting constructs using financial statement elements, such as assets and liabilities. The reliability of accounting information is dependent on how well accounting standards require and allow firms to accurately measure and classify economic constructs (Maines & Wahlen, 2006). Improper classification of economic constructs can be misleading to investors; therefore, it is important that the preparer of the financial statements accurately express the underlying economic substance of transactions.

In order to make accounting information as understandable and usable by decision makers as possible, items are grouped and arranged in the SOFP according to certain guidelines, such as, classifying and presenting assets in order of liquidity, or in accordance with their capability of being converted into cash. In Brazil and in Canada, entities are required to present assets in decreasing order of liquidity. Therefore, asset items that are readily convertible into cash are listed first and those that are least liquid, least likely to be converted into cash, are listed last (Beechy & Conrod, 2005).

Current assets include cash and other assets that are reasonably expected to be realized into cash or to be sold or consumed during the normal operating cycle of the business or within one year from the reporting date, whichever is longer. Inventory, listed as a current asset, represents items or products on hand that an entity intends to sell to its customers (Pratt, 2009).

With respect to current assets, paragraph 4.5 of the IFRS for SMEs (IASB, 2009d, p. 28) states:

An entity shall classify an asset as current when:

(a) it expects to realize the asset, or intends to sell or consume it, in the entity’s normal operating cycle;

(b) it holds the asset primarily for the purpose of trading;
(c) it expects to realize the asset within twelve months after the reporting date; or
(d) the asset is cash or a cash equivalent, unless it is restricted from being exchanged or
used to settle a liability for at least twelve months after the reporting date.

Non-current assets are assets that will not be used up within the next year, or assets that
management plans to retain beyond the next 12 months or normal operating cycle. According
to paragraph 4.6 of the IFRS for SMEs (IASB, 2009d), all assets that are not classified as current
shall be classified as non-current. Tangible capital assets include all property, plant, equipment,
and resources that are used in the entity’s production or service process, either directly or
indirectly (also called fixed assets because of their relative permanence, or by the more familiar
term property, plant and equipment – PPE) and investment property (IP). Paragraph 17.2 of the
IFRS for SMEs (IASB, 2009d, p. 92) says:

Property, plant and equipment are tangible assets that:

(a) are held for use in the production or supply of goods or services, for rental to others, or
   for administrative purposes, and
(b) are expected to be used during more than one period.

According to paragraph 16.2 of the IFRS for SMEs (IASB, 2009d, p. 89),

Investment property is property (land or a building, or part of a building, or both) held by
the owner or by the lessee under a finance lease to earn rentals or for capital appreciation or
both, rather than for:

(a) use in the production or supply of goods or services or for administrative purposes, or
(b) sale in the ordinary course of business.

Tangible capital assets include items that are subject to depreciation or depletion, such as
buildings, machinery, and fixtures, some biological assets, mineral deposits and timber stands,
and items that are not subject to depreciation, such as land.

With respect to intangible assets, which are also considered to be non-current assets,
paragraph 18.2 of the IFRS for SMEs (IASB, 2009d, p. 98) says,
An intangible asset is an identifiable non-monetary asset without physical substance. Such an asset is identifiable when:

(a) it is separable, i.e. capable of being separated or divided from the entity and sold, transferred, licensed, rented or exchanged, either individually or together with a related contract, asset or liability, or
(b) it arises from contractual or other legal rights, regardless of whether those rights are transferable or separable from the entity or from other rights and obligations.

Intangible capital assets (IA) are long lived assets that lack physical substance, which includes: brand names, copyrights, franchises, licences, patents, software, subscription lists, trademarks and goodwill. Intangible assets are characterized by the rights, privileges, and benefits of possession rather than by physical existence (Beechy & Conrod, 2005). Also, they are normally considered to have a higher degree of uncertainty than tangible assets (Pratt, 2009). Besides PPE, IP and IA, non-current assets also comprise long term financial assets, such as investments in subsidiary, joint-ventures, associates and other financial instruments that managers do not expect to realize within the next 12 months.

The accounting information outlined in financial statements is important to numerous different users. It is important that this information be relevant and reliable in order to assist users in their decision making process. Furthermore, the appropriate classification of SOFP items is critical to convey the real underlying economic substance of transactions to external users.

### 2.2. VAGUENESS AND THE ACCOUNTING PROFESSION

The general theory of language is to be descriptively, psychologically and pragmatically adequate; however, all natural languages show some degree of semantic vagueness. Virtually all concepts or categories used in everyday life, with the exception of certain mathematical concepts, are vague; therefore, it would follow that accounting, similar to other disciplines, suffers from vagueness (Penno, 2008). This section is dedicated to the discussion of previous
literature relating to the different types of vagueness, vagueness in the accounting setting, the gray zone, and real life examples of transactions that occur in the gray zone.

**Types of Vagueness**

Vagueness is the characteristic of an object, word, or concept related to an insufficient delineation of its meanings’ boundaries, created by linguistic imprecision, factual uncertainty, or both. Strictly speaking, vagueness and ambiguity are not synonymous. Ambiguity exists when a word or concept has multiple meanings and is used to describe distinguishable sub-concepts. For example, the word *present* could mean: (1) now existing or in progress, (2) a gift, or (3) to bring or introduce into the presence of someone. Ambiguity may be defined as the uncertainty about uncertainty or uncertainty about the probabilities with which outcomes can occur. Personality psychologists suggest that ambiguous stimuli and cues are vague, unclear, unstructured, incomplete, and with multiple meanings (Zebda, 1991).

Words are considered to be vague if, based on the intention of the words, it is indeterminate whether certain objects would fall within or beyond the scope of the words. For example, consider a man that is 75 years old. This man can be called *old*; however, can the same word be applied to someone who is 55 or 60? Perhaps the 78 year-old brother of that 75 year-old man does not consider his young brother old. It is difficult to determine where to draw the boundary between old and not old (Devos, 2003).

Vagueness exists when a word or concept lacks precise shape and boundaries, for example, bald means “having little or no hair on the scalp”, that is, one does not need to have no hair on any part of his head to be considered bald, and simply having little hair on the scalp is enough. The vagueness in this example resides in not knowing how little hair is required for the individual to be considered bald. The extremity of this example is better illustrated by the falakros paradox (HYDE, 1997):

\[
\text{Considering that } n \text{ tends to infinity:}
\]
If a man with n threads of hair on his head is not bald, then a man with n-1 threads of hair is also not bald;
If a man with n-1 threads of hair is not bald, then a man with n-2 threads of hair is also not bald;
If a man with n-2 threads of hair is not bald, then a man with n-3 threads of hair is also not bald;
...  
If a man with n-(n-1) threads of hair is not bald, then a man without a thread of hair is not bald;
A man without a thread of hair is not bald

The final statement is obviously false, which demonstrates that in the presence of vagueness, logical reasoning induces mistakes in interpretation.

There are two different types of vagueness: epistemic vagueness and semantic vagueness. Epistemic vagueness occurs when a distinct boundary is alleged to exist; however, it is indeterminate as to where the boundary actually is. Semantic vagueness occurs when a category is binary and a reliance on language is insufficient to determine the classification (Penno, 2008).

In relation to epistemic vagueness, residual uncertainty is inherent in any measurement technique; however, there are ways in which the technique can be improved which will decrease the error to a tolerably insignificant level. Whereas, with semantic vagueness judgment plays an important role because there may be indeterminate instances that cannot be verified as belonging to one category or another (Penno, 2008).

According to the epistemic conception of vagueness, what we use vague terms to say is true or false, but in borderline cases it cannot be determined which. Our ordinary perceptual application of vague terms, like the word small, defer to no fixed definition (Williamson, 1996). Suppose that Harry is a borderline case of baldness. Then the epistemic theory of vagueness has it that it is either true that he is bald or else true that he is not bald, but nothing we do will ever enable us to know the truth about Harry’s baldness; and likewise, for every other borderline case of a vague notion (Schiffer, 1999).

There are two different types of semantic vagueness, vagueness in criteria and vagueness in degree, both of which usually coincide with each other (Devos, 2003). The first type is related to
the uncertainty of the criteria used in the application of a word, which is also known as categorical or conditional vagueness. With vagueness in criteria there is intrinsic indeterminacy as to the exact conditions that are sufficient for the application of the term. For example, one might wonder on what basis a trip can be considered a big trip, whether rhubarb actually belongs to what we call fruit, or whether bridge and darts can be considered as sports. Objects may fall under numerous categories; therefore, there is indeterminacy about which category a new term will refer to (Prinz, 1998). The second type is related to the degree in which we can or cannot apply certain words, which is also known as gradual or quantitative vagueness. For example, when is a person considered tall? Can we still consider someone living ten houses further down the street a neighbour? The truth of statements involving the applicability of vague predicates to borderline cases is thought to be a matter of degree. Some degree theorists assign a number to a sentence which is dependent on their degree of truth. A sentence which is completely true will be assigned a number of one, whereas, a sentence that is completely false will be assigned a degree of zero (Aldred, 2004). Vagueness in degree tends to be more basic than vagueness in criteria because vagueness in degree is not decomposable, while vagueness in criteria often encompasses vagueness in degree. Vagueness in criteria is related to cognitive psychology and cognitive linguistics, whereas vagueness in degree has been studied in logic (Devos, 2003).

**Vagueness in Accounting**

As a set of procedures for preparing and processing information, accounting is suppose to help people make rational decisions; however, vagueness in accounting standards may limit the informative nature of the accounting information.

Accounting is said to be unbearably imprisoned with technical and conceptual ambiguities and inadequacies. For example, there is vagueness associated with the word “value”. Additionally, according to Davie (2000, p.312), “there is also a lack of any coherent and durable technical
definitions for assets, liabilities, profit, loss, revenue, function of the balance sheet, audit, auditor independence and other basics”.

Vague words and expressions are present throughout the standards that comprise the accounting profession. An examination of statements, terms, and rules frequently used by accountants reveals that vagueness exists in many accounting problems. For example, the statement “the financial statements fairly present the financial position of the firm” includes vagueness due to the imprecise meaning of the word “fairly”. With respect to vague expressions, professionals in different countries may interpret these expressions differently, thus, creating problems with cross-country financial statement comparability. Doupnik and Richter (2003) performed a cross-country study which involved accounting and auditing professionals in the United States and in German-speaking countries. The results provided evidence that language-culture affects the interpretation of uncertainty expressions in international accounting standards.

It is important to take into consideration that vagueness inherent in accounting standards may be a consequence of the costs incurred in setting accounting standards and that the objective of standard setters is to provide accounting standards that are principle oriented, rather than rules based. Many financial reporting standards use uncertainty expressions, such as “probable” or “reasonably possible”, in establishing the criteria used for recognition, measurement, and disclosure of items (Doupnik & Richter, 2003). Standards that allow preparers to exercise accounting judgment and estimation enable the preparer to misuse that latitude and report information that is biased and does not have representational faithfulness. Examples of latitude in standards include: flexibility in classification, flexibility in measurement attributes and flexibility in timing the adoption of new accounting standards (Maines & Wahlen, 2006).

Vagueness may not only provide grounds for misinterpretation of accounting standards, but may also provide practitioners with justifiable explanations for manipulation of accounting information. The vagueness present in accounting standards may provide the decision maker with protection against making mistakes, thus enabling the decision maker to manipulate
others (Zebda, 1991). By exploiting the latitude inherent in the vague language used in professional standards, practitioners have the ability to justify overly aggressive reporting decisions (Cuccia, Hackenbrack & Nelson, 1995).

In addition to vagueness in accounting standards, auditing standards also contain a significant amount of vagueness. With respect to Generally Accepted Auditing Standards (GAAS) there is no one correct audit approach to planning, gathering and interpreting audit evidence that comprise an audit report; therefore, there is a fair degree of latitude in how accounting firms can implement these standards (Humphrey, 2007). For instance, audit reports often state: “We planned and performed our audit so as to obtain all the information and explanations which we considered necessary in order to provide us with sufficient evidence to give reasonable assurance that the Group Financial Statements are free from material misstatement, whether caused by fraud or other irregularity or error. In forming our opinion, we also evaluated the overall adequacy of the presentation of information in the Group Financial Statements [...] In our opinion the Group Financial Statements give a true and fair view, in accordance with IFRSs”. Additionally, auditing standards incorporate verbal probability expressions to establish thresholds to signify when sufficient evidence has been gathered (Doupnik & Richter, 2003).

Many accountants treat vagueness as if it does not exist or as if it were randomness; however, the neglect of vagueness in the accounting environment may restrict the applicability and limit the usefulness of accounting models by impairing their descriptive and predictive ability (Zebda, 1991). According to Penno (2008), the accounting framework is based on rules and much like rules in law and society in general, these rules contain “gray zones”. The problem of vagueness is persistent in all rule systems, which indicates that decisions cannot be objectively described as simply “right” or “wrong”, but instead will be based on an authority’s judgement. Present linguistic imprecision in accounting standards and factual uncertainty in the adoption of these standards create gray zones, in which logical reasoning must be replaced by analogical reasoning.

The international accounting standards and the international financial reporting standards (IFRS), established by the IASB, have made advancements regarding the criteria used for the
recognition, measurement and disclosure of accounting information. Despite these attempts to
improve the relevance and the reliability of accounting information, in the search to reduce
information asymmetry between the entity and the market, the “real” capacity of assets to
generate economic benefits over time is only partially disclosed by the initiatives of fair value
accounting and fair disclosure.

According to Zebda (1991), many accountants have observed the inappropriateness of binary
classification of accounting objects and the Law of Excluded Middle and are aware that this may
lead to non-intuitive and unacceptable conclusions. Mainstream accounting theorists believe
that accounts can help produce better decisions. However, financial accounts can be
manipulated; therefore, their credibility as neutral, objective measures of organizational
performance is undercut (Carruthers, 1995).

The current classification of assets as inventory, PPE or intangible assets does not take into
consideration the capacity of certain assets to provide future economic benefits over time. As
accepted by the Framework, assets are classified into accounts depending on the specific
characteristics they possess; however, this classification may not be indicative of an asset’s real
potential cash inflow. This inaccurate classification of assets may be misleading to users of
financial statements, as the underlying economic values of transaction are not disclosed. The
problem associated with asset classification may occur due to the weak correlation between
the characteristics suggested by the Framework to discriminate assets, and their real liquidity,
which is created by epistemic and semantic vagueness (Cardoso & Aquino, 2009a).

**The Liquidity Paradox**

The concepts of inventory, PPE and intangibles have little sensitivity to liquidity, which is the
criteria used to organize assets on the balance sheet and is associated with the promptness to
which assets are expected to be converted into cash (Anthony & Reece, 1989). The concept of
liquidity is ambiguous, as it may be representative of more than one state or object, and
semantically vague, as there is no exact meaning for the term promptness (Cardoso & Aquino, 2009a).

Asset items are suppose to be arranged in order of liquidity and grouped into two classes: current assets (of greater liquidity) and non-current assets (of lesser liquidity). However, the accounting standards and accounting literature classify inventory as current assets regardless of whether or not cash is expected to be realized before the end of the subsequent reporting period. Additionally, PPE and intangibles are classified as non-current regardless of whether or not they are intended to be leased to a third party, thus, producing cash immediately (Beechy & Conrod, 2005, Pratt, 2009).

Based on Barnes (1982), Cardoso and Aquino (2009a) proposed the “liquidity paradox” to exemplify the semantic vagueness present in the liquidity concept:

Considering that the liquidity level of an asset is associated with its probability to be converted into a non-specific asset (e.g. cash):
A liquidity level of 1% does not make an asset liquid;
If a liquidity level of 1% does not make an asset liquid, then a liquidity level of 2% does not make an asset liquid either;
If a liquidity level of 2% does not make an asset liquid, then a liquidity level of 3% does not make an asset liquid either;
...
If a liquidity level of 99.99% does not make an asset liquid, then a liquidity level of 100% does not make an asset liquid either;
A liquidity level of 100% does not make an asset liquid.

The last statement is clearly false.

Liquidity is measured on a continuum scale; therefore, in order to classify items based on this criterion it is necessary to have distinctive cut off points or categories. Due to the unknown cut off points or boundaries, the liquidity concept contains both epistemic and semantic vagueness. Based on Penno (2008), to further illustrate the asset liquidity paradox, Cardoso and Aquino (2009a) presented the following figure.
Figure 1 – Illustration of the vagueness in the liquidity concept

As displayed in figure 1, vagueness is present with respect to asset classification on the SOFP. Items are definitely liquid (L_{True}) when their probability to be converted into cash is 100% and items are definitely not liquid (L_{False}) when their probability of being converted into cash is zero. Between these two extremes lies a gray zone, where an item’s probability of being converted into cash can be anywhere between 0% and 100%.

The vague nature of the concept of liquidity creates problems with respect to asset classification. With an indeterminate boundary between assets that are definitely liquid and assets that are definitely not liquid, it is difficult to utilize the liquidity concept to distinguish and categorize current and non-current assets on the SOFP.

**The “Gray Zone” Explored**

The IFRS do not specifically require certain assets to be recognized as current or non-current, the standards only provide guidelines for the appropriate classification; however, not requiring specific classification. On one hand, it is positive because the IFRS are mainly principle oriented. On the other hand, this may lead to a misunderstanding amongst practitioners regarding the
concepts of inventory, PPE and intangible assets, and the appropriate classification of items into each of these categories.

Cardoso and Aquino (2009a) identified five typical arrangements regarding the intensity of the transference of property rights. It was expected that the majority of economic transactions would be classified under these five arrangements; therefore, presenting additional information to mitigate epistemic and semantic vagueness. The rights transference intensity defines the level of transference of each attribute from vendor to buyer, which goes from one extreme, where a single set of attributes is transferred (e.g. a car rental transaction), to another, where all property rights related to an asset item are transferred (e.g. a finished goods sales transaction). The three main arrangements include:

- **NT**: No transference arrangement: where an asset has none of its attributes transferred and the vendor maintains all property rights over the asset;
- **PT**: Partial transference arrangement: where the vendor transfers at least one attribute to the buyer; however, maintains residual control rights over the asset (ex: car rentals); and
- **FT**: Full transference arrangement: where all potential future behaviours of relevant attributes are internalized in the price and the buyer accepts to receive a good or service without any type of warranty.

Cardoso and Aquino (2009a) utilized a multi-dimensional approach in an attempt to eliminate the liquidity vagueness present on the SOFP. The dimensions used to classify the asset’s liquidity included: (A) promptness to convert assets into cash; (B) whether or not the item provides revenue directly; and (C) whether the items ability to provide revenue is constrained to one single transaction or \( n \) transactions. Utilizing these three dimensions, Cardoso and Aquino (2009a) were unable to eliminate the vagueness problem. Dimension (C) was able to mitigate vagueness related to traditional account categories and boundaries (between NT, PT and FT); however, it was unable to mitigate liquidity vagueness because it did not guarantee that PT will always be less liquid than all FT. The ideal dimension \( k \) (D) was incorporated in the
In order to further investigate and explore the “gray zone”, Cardoso and Aquino (2009b) conducted a between-subject experiment, which was composed of 93 MBA students from different Brazilian States, all attending the same educational institution. The test instrument designed by Cardoso and Aquino (2009b) consisted of four sections. Section one requested the respondents to provide personal information. Section two presented an incentive for the subjects to take into consideration when answering the cases (incentive for aggressive accounting or for conservative accounting). Section three provided 12 mini cases, of which: nine were clearly related to a specific concept (three being clearly related to inventory, three to PPE, and three to intangibles), and the remaining three cases were not clearly related to any of the
three concepts, which had been classified \textit{a priori} as gray zone assets. The final section required the students to classify the 12 cases in accordance with three different criteria. The first table required the students to classify the cases using a dichotomy scale between inventory and PPE or intangible assets. The second table required the students to classify the cases on a five point Likert scale, in which the students identified: (1) definitely inventory, (2) probably inventory, (3) indifferent, (4) probably PPE or intangible assets, and (5) definitely PPE or intangible assets. The final table required the students to classify the cases in order of decreasing liquidity.

Of the total sample, 20.4% received the instrument with an aggressive accounting incentive and with mini cases that were described in less detail; 29% received the instrument with an aggressive accounting incentive and with mini cases that were described in more detail; 23.7% received the instrument with a conservative accounting incentive and with mini cases that were described in more detail; and the remaining portion of the sample received the instrument with a conservative accounting incentive and with mini cases that were described in less detail.

The result of this experiment indicated that in relation to items classified \textit{a priori} as gray zone assets the MBA students acknowledged the weakly defined boundaries between inventory, PPE, and intangible assets. The study was inconclusive with respect to how incentives, either aggressive or conservative, or transaction descriptions, either less detailed or more detailed, influence classification decisions.

\textbf{Examples}

This section has been presented with the purpose of providing real life examples of transactions that occur in the gray zone. The examples outlined below were presented in the financial statements and notes of different companies.

With regards to inventory, it is important to emphasize that Souza Cruz S/A (a British American Tobacco – BAT subsidiary established in Brazil) classifies a portion of its inventory of leaf
tobacco as non-current assets;\textsuperscript{1} however, BAT presents its entire inventory of leaf tobacco exclusively as current assets in the consolidated balance sheet.\textsuperscript{2} The practices of BAT are similar to those of its main competitor, Altria Group Inc., the controlling company of Philip Morris.\textsuperscript{3} Additionally, Rothmans Inc., a Canadian public company, also adopts similar practices to those of BAT, in which they classify their entire inventory of leaf tobacco as current assets.\textsuperscript{4} The practices of the European and North American tobacco industries ignore the liquidity of tobacco inventory in the presentation of the balance sheet; therefore, not disclosing the “real” capacity of these items to generate economic benefits over time. Nevertheless, the proportionate representation provided by the classification criteria of the Brazilian tobacco industry is more aligned with the liquidity of the inventory.

With regards to PPE, IAS 16 (IASB, 2009a) establishes that PPE intended to be leased should be classified as non-current assets, which is the current practice adopted by Localiza Rent a Car S/A, a Brazilian firm. This company also classifies the cash flow associated with the purchase of their fleets, in addition to the cash flow generated by the sale of their fleets, as investment activities.\textsuperscript{5} On the other hand, Blockbuster Inc., a U.S. DVD rental firm, and Rogers Communications Inc., a Canadian firm that rents DVDs, classifies their entire collection of videos intended to be leased (rental library) as current assets and the associated cash flow are classified under operating activities.\textsuperscript{6} In this respect, the IFRS and the criteria adopted by the Brazilian enterprises in the lease sector do not contain adequate disclosure requirements regarding the liquidity of the principal assets of the enterprises in this sector. The international accounting standards (IASB, 2009a; IASB, 2009c) only suggests the classification of PPE items as current assets when they are intended for sale, which are only extreme situations where an item no longer satisfies the concept of PPE. However, the practices adopted by North American

\textsuperscript{1} According to the standardized financial statements available at www.cvm.gov.br.
\textsuperscript{2} According to the 2008 annual report available at www.bat.com/servlet/SPMerge?mainurl=%2Fgroup%2Fsites%2Fsuk%5F%5F3mnfen%2FvwwPagesWebLive%2FDO52AK34%3Fopendocument%26amp%3BSKN%3D1. www.altria.com/investors/2_4_1_annualreport.asp.
\textsuperscript{3} According to the 2008 annual report available at www.altria.com/investors/2_4_1_annual report.asp.
\textsuperscript{4} According to the 2008 annual report available at www.sedar.com
\textsuperscript{5} According to the financial statements available at www.cvm.gov.br.
companies provide appropriate disclosures regarding the capacity of their principal assets to
generate cash. With respect to for-rental PPE, these items have the ability to provide economic
benefits on their own; therefore, in this respect these items are more similar to finished goods
inventory than to regular PPE. For-rental PPE also has the ability to provide economic benefits
that are not constrained to one single transaction; therefore, in this respect they are more
similar to regular PPE than finished goods inventory. Many for-rental PPE, for example rental
cars, have the potential to provide cash inflows during the first year after acquisition; therefore,
classifying these assets as non-current may be misleading to financial statement users.

With regards to intangible assets, independent of whether they are intended for internal use by
the entity that withholds it or whether they will be negotiated to a third party, IAS 38 (IASB,
2009b) suggests these items be classified as non-current assets. This is the practice adopted by
the Italian television channel, RAI, regarding the copyrights of the audiovisual works, diritti di
brevetto industriale and diritti di utilizzazione delle opere dell’ingegno. 7 Alternatively, the SFAS
139 (FASB, 2000) and the SOP 00-2 (AICPA, 2000) do not associate the classification of
copyrights of audiovisual works with intangible assets. Consequently, News Corporation,
controller of the North American television channel FOX, classifies copyrights, programming
rights, and film entertainment costs as items of inventory. These items are classified partially as
current assets and partially as non-current assets, 8 thus, indicating the capacity of their
principal operational assets to generate cash. Similar practices are also adopted by
Organizações Globo, the most important Brazilian television channel. Additionally, Canada’s
leading media company, Canwest Global Communications Corp., has also adopted similar
practices, in which their investments in broadcasting rights are classified partially as current
assets and partially as non-current assets. 9

To attribute the idiosyncrasies of accounting criteria for similar assets among enterprises of the
same economic segment exclusively based on accounting regulation does not seem to be
beneficial or appropriate. Accounting is a social institution, consequently, the accounting

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choices of regulators (regulatory choices or accounting regulation) and of companies (responses to regulation or regulation of accounting), are all forms of expressions of the values shared by society (Laughlin, 2007).

The economic transactions carried out by groups of companies, in addition to the intensity of the transference of property rights resulting from these transactions, are substantially similar to each other. Considering the similarity of the transactions, the differences in accounting criteria chosen amongst different companies can be explained by the inherent epistemic and semantic vagueness in the concepts related to accounting taxonomies (Cardoso & Aquino, 2009a; Keefe, 1998; Penno, 2008; Schiffer, 1999; Zebda, 1991), or by cultural characteristics that induce different interpretations of uncertain terms (Doupnik & Richter, 2003).

### 2.3. AUDITORS

Auditors play an important role in the operation of the economic system and have the primary responsibility of assuring users that the financial statements are free from material misstatements. The study of domain specialists (experts) is an area of interest to many researchers as the complexity of modern society increases the necessity of individuals to rely on the judgements and decisions of experts. This section will discuss the role of auditors, the impact of incentives faced by auditors, audit quality, auditor independence, and auditor size.

**Role of Auditors**

An agency relationship exists between the owners and managers of an entity; therefore, producing a natural conflict of interest due to the information asymmetry that exists between the manager and the absentee owner. The manager has access to more information regarding the true financial position of the entity than does the owners of the entity. If both parties were to maximize their own self interests, it is likely the manager would not act in the best interest of the owners. The managers are responsible for the financial reporting and the owners are
unable to observe all the actions of the managers; therefore, providing the managers with the opportunity to manipulate the reports. This leads to the need for auditors.

It is the responsibility of the directors/managers to maintain records, to prepare financial statements that are in accordance with Generally Accepted Accounting Practices (GAAP), and to give an accurate depiction of the true financial position of the entity. The auditor is required to express an opinion on whether or not the statements are in compliance with GAAP (Bailey, 2010). The auditor’s main role is to verify the accuracy of the financial reports and to provide services that add reliability, credibility, relevance, and timeliness to the information (Messier, Emby, Glover, and Prawitt, 2008). Certification of financial statements by certified external auditors is suppose to assure investors that, in adhering to standards, managers’ financial disclosures accurately and reliably reflect the financial condition of the companies they manage on behalf of the owners (Palmon & Sudit, 2009). Auditors play an essential role in the operation of the economic system, as they have the role of judging the financials and being trustworthy evaluators of accounting reports. Society expects that auditors will resist pressures to conform to firm or client practices when such practices depart from professional rules (Warren & Alzola, 2008).

The primary responsibility of the auditor is to assure outsiders that the financial statements are free from material misstatements. The auditor is responsible for collecting and evaluating audit evidence in order to assess whether the representations in the financial statements are in compliance with accounting standards. Additionally, the auditor is responsible for carefully exercising his or her own professional judgment to determine whether or not the financial statement information accurately reflects the intent of the accounting standards, not simply the literal interpretation of the standards (Messier et al., 2008).

It addition to providing credibility to current financial information, evidence suggests that when auditors are connected to forecasted financial information, this may also provide validation of this information. It has been found that auditors’ association with forecasted financial information increases the likelihood that the forecast would be accurate and free of clerical errors (Schelluch & Gay, 2006).
Auditors have many roles and responsibilities; however, the public’s perception and the auditor’s perception of these specific duties are not in an exact alignment. This difference in the perception of auditor’s duties is known as the expectation gap, in which the exact cause has yet to be determined (Schelluch & Gay, 2006). It has been found that the expectation gap is the greatest between auditors and shareholders. Many investors have the belief that auditors provide assurance that the entity has not committed any fraud and that the entity will continue to remain solvent in the future; however, this assurance is not part of an auditor’s responsibilities (Bailey, 2010). The expectation gap may be detrimental to the auditing profession because it has resulted in a number of lawsuits against auditors and unfavourable court decisions (Zhang, 2007).

The purpose of an audit is to enhance confidence in the financial statements; however, it is important that financial statement users understand the limitations of audited financial statements. An audit does not provide assurance regarding the competency and integrity of the directors and senior management, the quality of their decision making, or the risk profile of the investment. Investors should understand the limitations of the roles of auditors and should utilize the audited financial statements in addition to other resources when making their final investment decisions.

Incentives that Influence Auditors

Incentives are any factors that motivate a particular course of action and there are many factors that may influence the decision making process of auditors. Libby, Bloomfield, and Nelson (2002) provides evidence that managers and auditors use the flexibility inherent in accounting rules to make disclosures that are favoured by their incentives. The motivations and incentives of public auditors, rather than their competence, has become a central issue in the audit setting (Palmon & Sudit, 2009).

As indicated by Maines and Whalen (2006), accounting information reliability impairments occur due to preparers responding to incentives by interpreting or applying standards in a non-
neutral fashion. The type of reliability impairments and the processes by which they occur depend on the interactions between the preparer’s incentives and accounting standards.

Managers are interested in pursuing their own self-interests and therefore have motivations of their own that also influences their selection of accounting policies and accounting estimates. These motivations may conflict with financial statement users’ objectives and may dominate the accounting choice. Some of the most common management motivations include: income maximization, which enables easier compliance with debt covenants, influences the users’ judgment in evaluating the performance of management, and helps to enhance managements’ compensation; income minimization, which enables a entity to avoid attracting competitors, to discourage hostile takeover bids, to avoid scrutiny of regulators or politicians, and to discourage large wage claims by employees; and income smoothing, which shows a smooth record of earnings that is free of peaks and valleys (Beechy & Conrod, 2005).

It is essential for there to be cooperation between managers and auditors in order for auditors to obtain the necessary evidential matter and to satisfy other fieldwork standards; however, this cooperation may have negative repercussions, such as auditors misreporting their assessment of financial statements (Schatzberg, Sevcik, Shapiro, Thorne & Wallace, 2005). Due to the cooperation between the manager and the auditor, it is important to take into consideration the incentives of managers because these incentives may cause managers to exert pressure on auditors to pursue their own self-interests and agendas. Auditors may have an incentive to lower audit quality in order to satisfy and retain a specific client (Deis & Giroux, 1992).

Generally accepted auditing standards, auditing textbooks, and firm audit manuals indicate that, the presence of significant monetary incentives based on financial results increases the inherent risk of material misstatements (Hirst, 1994). External auditors are hired by and paid by the firm in which they are auditing; therefore, conflicts of interest exist as the auditor has a strong economic incentive to satisfy their client (Palmon & Sudit, 2009). As a result of economic incentives, an auditor may be inclined to issue a standard unqualified report on financial statements that adopt overly aggressive accounting policies. This may enhance the auditors’
relationship with the manager; however, this would be at the expense of third parties that rely on the financial statements (Schatzberg et al., 2005). The auditing firm is vulnerable to the pressures exerted by clients because they are interested in furthering their relationships with these clients and securing future business.

Incentives have a significant impact on an auditor’s personal judgment and interpretation of accounting standards, which was exemplified in a study performed by Cuccia et al. (1995). This experiment was undertaken in a tax setting in which subjects were provided with an incentive to report either aggressively or conservatively and a practice standard which employed a vague, verbal threshold or a stringent, numerical threshold. The results of the study indicated that subjects that were given an incentive to report aggressively made more liberal interpretations of the standard, which employed a vague, verbal threshold, than those who had an incentive to report conservatively. Additionally, when given an aggressive incentive, the subjects’ interpretations of the standard were liberal enough to justify their aggressive reporting decisions. Subjects that were provided with an incentive to report aggressively, but were given a more stringent, numerical threshold, as opposed to a vague, verbal threshold, used the latitude available in assessing the evidential support to justify an aggressive reporting decision. The results of this study indicate that the decisions made by practitioners with an incentive to report aggressively may be unaffected by more stringent professional standards.

Incentives have the ability to influence an auditor’s decision making process and can significantly affect the outcomes of an audit. This is important for external users to consider when utilizing information validated by auditors. In the presence of vague accounting standards, auditors are able to exercise their own personal judgments in interpreting these standards and their judgments may be influenced by external incentives. According to Maines and Wahlen (2006), users pay attention to the incentives of firms issuing information and react more strongly to information when the firm acts counter to incentives. A number of studies indicate that investors are likely to accept standard-setters’ and preparers’ classifications and not adjust for unreliable reporting, which may be due to the investors not fully understanding the nature of economic constructs.
Evidence indicates that auditors are more likely to allow their clients to take aggressive accounting positions when they are able to justify the aggressive position with aggressive interpretations of the relevant accounting regulations (Libby et al., 2002). Additionally, Libby et al. (2002, p. 782) also specifies that, “managers and auditors use the flexibility inherent in accounting rules to make disclosures that are favoured by their incentives”. When flexibility in accounting standards is present, incentives may have a significant impact on disclosure decisions.

**Audit Quality**

Audit quality is difficult to measure and in addition to this problem, is the potential conflict between cost and quality. Further costs, in efforts and time, are usually incurred in order to increase the quality of an audit (Sweeney, Arnold, & Pierce, 2010). As indicated by Humphrey (2007), there are competing views regarding the quality of auditing practice and professionalism among senior researchers in the field; however, the overall view of audit quality with respect to auditor performance in larger firms is fairly positive. According to Humphrey (2007), business, not professional values, has come to dominate the American accounting profession and commercial interests have undermined the core values of the professional firm; therefore, it is important to take into consideration the management philosophy and practice within audit firms. Conflicts of interest are inevitable in any institutional arrangement; therefore, with respect to audit quality it is important to consider how these conflicts are managed.

Audit quality can be defined as the probability that the auditor will discover and report a breach in the client’s accounting system (Deis & Giroux, 1992). The probability of an auditor discovering a breach in the accounting system is related to the auditor’s technical capabilities, whereas, the probability of the auditor reporting an error is related to the auditor’s independence. To perform a quality audit, an auditor requires a combination of both practical experience gained on the job and theoretical knowledge gained by studying for professional
qualifications (Windmüller, 2000). Auditor competency is the degree to which an auditor is able to comply with professional standards and has a significant impact on individual auditor judgments (Martinov-Bennie & Pflugrath, 2009). Audit quality is not only dependent on the technical dimension and experience of the auditor, but is also affected by the ethical dimension of the auditor’s competency.

Literature also proposes that the quality of an audit may be associated with more conservative reporting. The results of a study performed by Lee, Taylor and Taylor (2006) provide support for the view that high quality auditing is associated with more conservative reporting because conservative accounting can facilitate the monitoring role of financial reporting data. The controversy over auditor independence focuses on alleged overstatements of periodic results; therefore, audit quality may be linked to conservative reporting.

Audit quality may also be related to the public’s expectations of the auditor. When the gap between the standard audit quality and the public’s expectations is smaller than a specified level, the cost for the auditor to comply with the standards is higher than the cost of meeting expectations. For this reason, auditors may reduce their efforts and only meet expectations instead of complying with standards (Zhang, 2007). Higher public expectations of auditors can help to improve audit quality.

Variations in audit quality may be explained by the reputation of auditors or by the power conflict between the auditor and their client. When power conflicts arise, the client may pressure the auditor to violate professional standards, and large, financially healthy clients can exert greater pressure with the threat of replacing an auditor. The study conducted by Deis and Giroux (1992) indicated that large financially healthy clients received lower quality audits and financial statement users perceive auditors of large healthy clients as less independent. The balance of power is dependent on whether the auditor places greater significance on the reward mediated by the client or whether the client places greater emphasis on the rewards mediated by the auditor.

There are a number of different variables that may influence audit quality, such as, the trade-off between cost and quality, managements’ philosophy and practice within audit firms, auditor
competency, the public’s expectations, and the power of the client. Additionally, auditor independence and auditor size have a significant impact on audit quality, both of which will be discussed in the following sections.

Auditor Independence and Audit Quality

Auditor independence has a significant impact on audit quality and is one of the most important issues facing the auditing industry (Khalil & Lawarree, 2006).

The definition of auditor independence has been conceptualized in a variety of different ways, which ranges from a focus on the nature of the decision (unbiased, objective) to the groups involved in the decision (clients, shareholders, public). Auditor independence can be viewed as the ultimate allegiance to the corporation’s shareholders, creditors, and investing public. With regards to this view, the auditor should remain completely independent from the influences of the client. Another view of auditor independence focuses on the auditors’ abilities to make appropriate decisions and to accurately depict the financial standing of firms. The auditor should not be affected by the influences that compromise professional judgment; therefore, enabling the auditor to act with integrity and exercise objectivity and professional scepticism. Furthermore, auditor independence can be viewed with respect to the auditor’s professional responsibilities and duties. The main responsibilities of the auditor are to act objectively and to perform audits with competence and due care. In order to make independent decisions that serve the best interests of society, auditors must resist the pressures and corrupt influences that depart from their professional duties, from both their employer and the client firm (Warran & Alzola, 2008).

The study performed by Khalil and Lawarree (2006) revealed that auditor’s independence can be compromised with relative ease. Additionally, due to recent events, the credibility of external auditors has been questioned; however, auditors that can create a reputation of diligence and independence are well rewarded.
As indicated by Windmöller (2000), professional and regulatory entities have suggested primary factors or drivers that are deemed to suggest auditor dependence, which include:

- auditors holding shares and other direct/indirect financial interests in the audit clients;
- key audit client personnel being family members or having a close personal relationship with the auditor; and
- auditors forming joint ventures or alliances with audit clients.

Some research suggests that non-auditing services threaten auditor independence; however, the conclusions regarding the effect of non-audit services on auditor independence is mixed. Many firms pay audit firms a significantly larger amount for non-audit services than for audit services, which may create an unhealthy degree of economic dependence between the auditing firm and the client (Iyengar & Zampelli, 2008). Additionally, non-audit services may create a conflict of interests, as many services are in the form of management consultation. In this case, the manager becomes the auditor’s client as oppose to the shareholder, which is the case with audit services. Auditors may be inclined to overlook questionable accounting practices when auditing the client’s financial statements because they fear they will lose non-audit business from the same client. Despite some research findings, which indicate that non-audit services compromise auditor independence, Windmöller (2000) indicates that a number of surveys have shown evidence that the provision of non-audit services have rarely contributed to an alleged audit failure. Although the conclusions regarding the actual effect of non-audit services on auditor independence is uncertain, it is plausible that the purchase of non-audit services gives the appearance of reduced auditor independence, thus, reducing earnings quality.

The perceived value of the auditor depends on the outsiders’ perception of the probability that the auditor will discover the errors in the reporting system (depends on the technical capability of the auditor) and on the probability that the auditor will report the discovered errors (depends on the degree of auditor independence). It has been discovered that an auditor’s ability to withstand pressure from clients (their independence) is related to the auditor’s reputation and the size of their client base (Niemi, 2004).
Windmöller (2000) argues that a focus on other measures, besides independence, to improve audit quality should be emphasized. This would include encouraging a better understanding of the various rules and regulations, coupled with a continual focus on obtaining greater clarity and harmonization of accounting and auditing rules. Furthermore, an emphasis should be placed on the adoption of international accounting standards in all countries and their acceptance by all the major stock exchanges.

**Auditor Size and Audit Quality**

Regulators have typically contended that quality is independent of the size of the audit firm; however, research has provided strong evidence to support the positive association between audit firm size and audit quality. Investment bankers, analysts, attorneys, and audit committee chairs, in specific, have indicated that they perceive lower audit quality when non-big 4 firms performed an audit (Flynn, 2009). In addition to a higher perceived level of quality, it has also been found that in larger firms there is a significantly lower amount of error.

Audit quality is related to the number and extent of audit procedures performed by the auditor and the amount of resources available in which to conduct tests. Larger audit firms have greater resources at their disposal; therefore, they are able to perform more powerful tests, resulting in more precise information and higher quality audits than smaller firms (Davidson & Neu, 1993). Smaller firms may be technically competent; however, they may not have the necessary resources available to perform as in-depth tests as larger firms are able to, which comes back to the conflict between cost and quality. Smaller firms may be required to sacrifice a certain amount of quality in order to maintain within their budget.

The study performed by Deis and Giroux (1992) provided evidence that quality improves as the firm’s number of clients increases. Larger audit firms, in comparison to smaller firms, have fewer incentives to compromise their standards to ensure retention of clients (Davidson & Neu, 1993). Larger offices are less likely to be dependent on any one specific client, thus, they are better able to resist the pressures exerted by clients for biased reporting (Choi, Kim, Kim, &
Zang, 2010). Auditors invest significant amounts in building and maintaining client relationships; therefore, larger audit firms possess larger numbers of clients than smaller firms and as a result have greater total collateral and much more to lose in the event of an audit failure (Niemi, 2004). Audit firms that possess large client bases are more interested in maintaining a positive reputation than giving into individual client demands that compromise their professional standards.

The effect of auditor size and audit quality is not only evident between the Big 4 companies and smaller firms, but this is also experienced amongst small sized firms. The results of the study performed by Colbert and Murray (1998) indicated that even among small Certified Public Accountant (CPA) firms, size is an indicator of quality for firms that perform audits, reviews, and compilations. Additionally, it was indicated that sole practitioners performed more poorly than other firms.

Literature also suggests that clients are willing to pay a higher fee for audits performed by larger firms, which indicates that clients also associate larger firms with higher quality audits. Choi et al. (2010) provide support that larger offices are able to charge higher audit fees than smaller firms; therefore, indicating that quality differential is priced as a fee premium for audit services. This result was confirmed in the study performed by Niemi (2004), which indicated that both auditor size and technical capability (working experience and education) has a positive impact on auditor remuneration.

There is strong evidence to support that large audit firms provide higher quality audits than smaller firms; however, it may be the case that good firms with good earnings quality hire high quality auditors (big 4 firms). Francis (2004) argues that outright audit failures with material economic consequences are very infrequent and that audit quality is at a socially desirable level. Due to the heterogeneous nature of the Big 4 firms, as evidenced in individual corporate scandals and failures, it is important to focus attention on individual office practices and institutional differences across countries.

According to Francis (2004), to restore public confidence in auditing, to restore the public’s perception of quality, and to perhaps increase audit quality, accounting firms can signal their
unambiguous commitment to audit quality by not engaging in any non-audit services with audit clients. This will help to convey the message that independent auditing is the core value and core business of public accounting firms.

There has been much focus, both previous and present, on research associated with the relationship between audit quality and auditor size. There is significant evidence to support the positive association between auditor size and audit quality. Larger audit firms are associated with greater amounts of resources available to conduct their audit tests, larger client bases, and better reputations, which all contribute to higher quality and greater remuneration. Additionally, literature suggests that forecasts audited by larger auditors are more accurate than forecasts audited by smaller auditors (Lee et al., 2006). As indicated by Niemi (2004), larger audit firms, with international reputations, are associated with higher quality audits and more accurate reports.

2.4. DECISION MAKING PROCESS

Simon (1994) uses the term decision making to encompass three classes of thoughts: the first class is discovering problems that require attention and attending to them; the second class involves thinking about what alternatives and what solutions will solve the problem; and the final class is associated with evaluating the solutions and choosing amongst them. There are a number of different theories associated with the decision making process. The purpose of this section is to provide a discussion relating to rational choice theory, bounded rationality and the use of heuristics and biases, dual system processing, and computational models of analogy making.

Rational Choice Theory
According to Korobkin and Ulen (2000), Rational Choice Theory (RCT) is a powerful, straightforward, compelling, and empirically useful construct and many disciplines have adopted this theory as their primary account of human decision making.

There is no one definitive formulation of RCT; however, Morrell (2004) describes RCT as a common set of assumptions about how and why people choose. RCT includes assumptions relating to the nature of people, which includes: seeking to maximize utility, assessing alternative options in terms of net gains, and implementing options they expect will result in the greatest utility.

RCT assumes that people are rational individuals and behave as though they engage in a cost-benefit analysis of every single alternative available to them before opting for the choice that maximizes their total profits and minimizes their total losses, thus, providing the greatest overall total utility (Hay, 2004; O’Grady, Asbridge & Abernathy, 2000).

Korobkin and Ulen (2000) highlight four main conceptions of RCT: definitional version, expected utility version, self-interest version and wealth maximization version. These conceptions occur at specific points along a spectrum, ranging from “thin” conceptions, which include relatively less specific and precise predictions of the theory, to “thick” conceptions, which include relatively more specific and precise predictions and are more easily falsifiable by empirical evidence. The definitional version is the thinnest conception of RCT and only postulates that “man is a rational maximizer of his ends, without providing any predictions regarding what ends an individual might attempt to maximize or what means he might employ in such an effort” (Korobkin & Ulen, 2000, p. 1063). This version of RCT is non-falsifiable because any behaviour can be justifiable as rational behaviour.

The expected utility version is also a thin conception of RCT in the sense that it does not specify what preferences or goals decision-makers will pursue; however, this version is thicker than the definitional version because it specifies the means by which a person will seek to satisfy their goals. The expected utility version is the most dominant version in microeconomics. In this conception a decision maker conducts a cost-benefit analysis of the different alternatives and
selects the optimal option, which maximizes the expected benefits and minimizes the expected costs, to achieve their goals.

Analysis of the foundation of expected utility theory reveals four fundamental assumptions: cancellation, transitivity, dominance, and invariance (Korobkin & Ulen, 2000; Tversky & Kahneman, 1986). The cancellation assumption specifies that any states of the world that results in the same outcome will be eliminated, in other words, the choice between options should depend only on states that yield different outcomes. Transitivity is the assumption that if an actor prefers choice A to choice B and choice B to choice C, then he should prefer choice A to choice C. Dominances indicates that an actor will choose the option that is better than all other options in the same state and is at least as good in all other states. Another necessary condition is invariance, which indicates that different representations of the same choice problem should result in the same preference choice. The order of these four assumptions goes by normative appeal, from the cancellation condition, which has been challenged and rejected by many theorists, to transitivity, which has been questioned by many theorists, to dominance, which is essential, to invariance, which has been accepted by the majority of theorists (Tversky & Kahneman, 1986).

A thicker conception than the expected utility version is the self-interest version. This conception states that decision makers will seek to maximize their own self-interests. Individuals have exclusively self-interested preferences and will always maximize his or her self-interested preferences (Zsolnai, 1998). The thickest conception of RCT is the wealth maximization version, which provides more specific predictions about the ends of decision makers than does the self-interest version. This version states that decision makers seek to maximize their financial well-being.

Rational choice theories include numerous different theories that employ the rationality assumption. Rational choice makes the assumption that outcomes are the result of choices made by actors (Quackenbush, 2004). Despite the numerous advantages and benefits of RCT, there are also several shortcomings that must be taken into consideration.
Criticisms of Rational Choice Theory

Much criticism surrounds the topic of RCT. There are implausibility problems associated with RCT, which includes the fact that decision makers often fail to maximize their expected utility and the fact that context plays an important role in behaviour (Korobkin & Ulen, 2000).

Thin conceptions of RCT are useful for recognizing that people act a certain way for a specific reason; however, these conceptions are unable to predict the actions the decision maker will take. Thick conceptions of RCT are able to not only generate predictions regarding the means a decision maker will seek to satisfy their goals, but are also able to predict the preferences and goals of a decision maker. The major drawback of thick conceptions is that the predictions they make about the preferences of the decision maker can be demonstrated to be incorrect in many circumstances (Korobkin & Ulen, 2000).

Criticisms of RCT include situations where individuals violate the basic assumptions when faced with decision problems. A rational individual will collect all the information necessary to generate a range of different alternatives; however, this process can prove to be both lengthy and costly. Once the information is collected the individual needs to evaluate. It is extremely unlikely for a person to be able to acquire perfect and complete information; therefore, an individual is always faced with uncertainty. No individual will have the time to weigh the positives and negatives of the overwhelming number of potential choices, thus, making an informed final selection incredibly difficult. Additionally, decisions are usually not isolated choices, but instead are a part of numerous other decisions; therefore, decisions may not always be purely rational as these decisions may be made as a consequence of other decisions already made in the past. RCT does not take into account the influence of previous actions on present preferences (Morrell, 2004).

Korobkin and Ulen (2000) make the point that actions that have been made in the past may increase the likelihood of the same actions being repeated in the future, which may be the result of habits, traditions or social norms. Individuals may engage in repetitive behaviours out of habit as a way of reducing decision making costs and efforts. Moreover, traditions may have
an influence and conscious effect on individual preferences, which is related to the status quo bias. People may also engage in behaviours that are not in their own self-interest merely because it is required by social norms.

Many studies have shown evidence for the violation of the invariance assumption of RCT (Korobkin & Ulen, 2000; Tversky & Kahneman, 1986). The framing of decision problems influences an individual’s decision, even when the options are equivalent; therefore, producing systematic violations of invariance and dominance.

According to Hay (2004), rational choice is not a theory that can stand alone, but instead it is a theory that needs to be supplemented by other theories. One of the major shortcomings of RCT is its inability to explain behavioural anomalies; however, despite the many criticisms, RCT is still a viable description of human decision making. According to Korobkin and Ulen (2000, p. 1076), “rational choice theory is descriptively and prescriptively accurate more often than any other single theory of behaviour”.

**Bounded Rationality**

Bounded rationality is simply the idea that the choices people make are determined not only by some consistent overall goal and the properties of the external world, but also by the knowledge that decision makers do and don’t have of the world, their ability or inability to evoke that knowledge when it is relevant, to work out the consequences of their actions, to conjure up possible courses of action, to cope with uncertainty, and the adjudicate among their many competing wants (Simon, 2000, p. 25).

Bounded rationality is a school of thought about decision making that was developed by Herbert A. Simon in the 1940s and 1950s. Bounded rationality was mainly developed due to the dissatisfaction with other decision theory models of choice. Bounded rationality, similar to rational choice theory, assumes that decision makers are goal oriented; however, it also takes into consideration the cognitive limitations of decision makers (Jones, 1999).
Theories of bounded rationality attempt to identify procedures for decision making that are computationally simpler and that can account for observed inconsistencies in human decision making patterns. Theories of bounded rationality are not only theories of decision making that make the assumption that an individual wishes to achieve goals, using his or her own mind as well as possible to achieve that end, but are also theories that take into consideration the decision process and the actual capacities and limitations of the human mind (Newell, Milcate & Newman, 1990).

According to Korobkin and Ulen (2000), people make boundedly rational decisions for two difference reasons. The first reason is related to the high costs associated with information collection and processing, which causes people to make decisions that are only satisfactory. The second reason is associated with the unintentional use of heuristics and biases, which influences the decision making process.

Maximizing utility bears no resemblance to what humans actually do when making decisions. The world is more complicated and complex than our minds are able to comprehend; therefore, in order to deal with problems individuals look for courses of actions that are satisfactory, but may not maximize utility (Simon, 1994). An individual uses aspiration levels, which are assessments about what is reasonable and likely for the world to provide them if they work hard and make good decisions, as a reference against which to determine if a solution is satisfactory or not.

The world is full of endogenous factors that lead to complexity and uncertainty; therefore, in many situations, rational choice may not be feasible because future situations and consequences are incalculable (Augier & Kreiner, 2000). At this point a person reaches their cognitive and information processing limits and their ability to solve the problem is bounded; therefore, they are unable to find the optimal solution.

In addition to the high complexity of the world and the cognitive limitations of humans, non-utility maximizing behaviour may also be the consequence of the high costs associated with obtaining and processing the information necessary to maximize utility. In some situations decisions are highly complex relative to the value of the resources involved or the capacities of
those making the choice. In these situations a person may utilize a simplified decision strategy instead of undergoing a complete cost-benefit analysis, which may result in a choice that does not maximize their expected utility. Additionally, ambiguity may occur in two different types of situations. The first situation is where an individual does not know the outcomes of the alternative choices, but does know the distribution of the outcomes. The second situation, which is troubling for RCT, occurs when individuals are faced with ambiguity concerning the content of decision alternatives (Korobkin & Ulen, 2000).

A second reason for making boundedly rational decisions may be the result of the unintentional use of heuristics and biases in decision making (Korobkin & Ulen, 2000). Decision makers often fail to maximize their expected utility and make less than optimal choices by utilizing a range of heuristics rather than engaging in complex cost-benefit calculations.

It has been demonstrated in behavioural science that individuals are systematically biased in their predictions of the probable results of different events. These systematic errors may be the result of individuals relying on a number of heuristics of judgement, such as representative, availability, and anchoring, which simplify complex decision making tasks and reduce the cost of information processing. Representative heuristic refers to the tendency of an individual to ignore a base rate and overestimate the correlation between what something appears to be and what something actually is. The availability heuristic refers to situations where an individual determines the frequency or probability of an event by the ease with which the instances can be brought to mind. Anchoring is when an individual makes estimates from an initial value and different starting points yield different estimates, which are biased towards the initial value (Poulton, 1994).

Additionally, decision making errors may result from individual perceptual biases, such as overconfidence bias, self-serving bias, and hindsight bias. Heuristics and biases may result in decision makers choosing options that do not maximize their expected utility and violate the predictions of RCT. Overconfidence bias refers to the belief that good things are more likely than average to happen to us and bad things are less likely than average to happen to us. Self-serving bias occurs when individuals interpret information in ways that serve their own self
interests. Hindsight bias indicates the tendency of an individual to overestimate the prediction that they had concerning the likelihood of an event actually occurring after learning that it had already occurred (Poulton, 1994).

Individuals making decisions want to make rational choices; however, they are not able to always do so, but their choices are intended to be rational (Jones, 1999). Bounded rationality assumes that actors are goal-oriented, in addition to recognizing the limitations of decision makers in attempting to achieve these goals. The world is undeniably complex and complicated and in many situations it is not realistic for decision makers to acquire and process all the information necessary to make an in-depth cost-benefit analysis of all possible alternatives. Individuals possess limited cognitive resources in which to make decisions; therefore, instead of maximizing utility, people often settle for a satisfactory solution. Additionally, people often take mental shortcuts to solve highly complex problems due to their limited cognitive processing capacity.

**Dual System Processing**

Numerous studies have been conducted to investigate the deviation of individual’s responses from performance that is considered normal on many reasoning tasks. Individuals assess probabilities incorrectly, they display confirmation bias, they violate the axioms of utility theory, they over-project their own opinions on others, they allow prior knowledge to become implicated in deductive reasoning, and they display numerous other information processing biases (Stanovich & West, 2000).

People that posses higher cognitive abilities differ in a variety of different ways from those with lower cognitive abilities, such as, on average, they live longer, earn more, have larger working memories, and have faster reaction times. As indicated by Frederick (2005), Cognitive Reflection Test (CRT) scores are predictive of the types of choices that feature prominently in tests of decision making theories, like expected utility theory. CRT measures cognitive reflection, which refers to the ability to resist reporting the first response that comes to mind.
The study performed by Frederick (2005) contained three CRT problems that were supposed to yield incorrect “intuitive” responses. To answer the questions correctly respondents would be required to suppress incorrect answers that intuitively came to mind and to take a moment to reflect upon the questions. The results of the study showed that only 17% of respondents, in which the sample was composed of students from top American universities, correctly answered all three CRT questions. The study also provided evidence that the respondents with higher CRT scores favoured receipt of later larger rewards, as oppose to early smaller rewards.

Researchers have made a distinction between two different types of cognitive processes: those that are executed very quickly with little conscious deliberation or effort and those that are executed more slowly and are more reflective. The differences between the two systems have been investigated to determine the contradictory results in studies of judgement under uncertainty. Dual processing theories of thinking have contributed significantly to explaining people’s rational thinking failures by proposing two different human reasoning systems (De Neys, 2006).

The terminology surrounding dual system processing varies amongst the numerous different theorists; Esptein (1994) characterizes the two systems as experiential and rational; Sloman (1996) describes them as associative and rule-based; Kokis, Macpherson, Toplak, West and Stanovich (2002) has defined them as the heuristic system and the analytic system; and Stanovich and West (2000) have termed them as System 1 and System 2. Despite the difference in terminology, there is considerable agreement amongst researchers regarding the characteristics that categorize the two systems (Kahneman, 2003).

System 1 is described as a typically fast, automatic, effortless, associative, implicit, intuitive reasoning process that is subject to emotional influences and is often utilized to make many decisions in a near simultaneous manner (Alter, Oppenheimer, Epley, & Eyre, 2007; De Neys, 2006; Kahneman, 2003; Leaptrott & McDonald, 2008; Sloman, 1996; Stanovich & West, 2000). System 1 is considered to be automatic and unconscious, does not demand a very high level of computational capacity, and conjoins properties of automaticity and heuristic processing (Stanovich & West, 2000). Interpretations that are triggered by System 1 are highly
contextualized, personalized and socialized. Additionally, System 1 is governed by habit and is therefore difficult to control or modify.

System 2 describes a slow, effortful, logic-based process that results in decisions that are made sequentially rather than simultaneously (Alter et al., 2007; De Neys, 2006; Kahneman, 2003; Leaptrott & McDonald, 2008; Sloman, 1996; Stanovich & West, 2000). System 2 is characterized by qualities of those typified as controlled processing and encompasses the processes of analytic intelligence (Stanovich & West, 2000). System 2 is always involved in judgements, which are always intentional and explicit. One of the functions of System 2 is to monitor the quality of mental operations and overt behaviour; however, the monitoring function is prone to allow many intuitive, sometimes erroneous, judgments to be expressed. The controlled processes of System 2 serve to de-contextualize and de-personalize problems. Additionally, the analytic system is more strongly correlated with the individual differences in the computational capacity of people (Kokis et al., 2002).

The biases that occur due to System 1 heuristic processing may be considered universally shared by all humans; however, for some individuals System 2 processes operate in parallel with System 1 and therefore they have the ability to override the primary response elicited by System 1 (Stanovich & West, 2000). It is possible for an intuitive judgment to be overridden if it is identified by System 2 as a bias. The corrective operations of System 2 are impaired by time pressures, by concurrent involvement in a different cognitive task, by performing the task in the evening for morning people and in the morning for evening people, and by being in a good mood. If an individual becomes aware of the use of a heuristic or bias, they will be able to adjust their judgments and correct for these actions (Kahneman, 2003).

System 2 reasoning requires a greater use of appropriate information and analysis. Additionally, a greater use of System 2 reasoning by the decision maker will result in better solutions to more complex problems, than a greater use of intuitive reasoning. Decision making processes that are made in a very limited time period, with a limited amount of information collection and analysis, and little consideration of different alternatives could likely be described as intuitive.
Decisions that are made carefully after much information search, consultation, analysis and evaluation of alternatives could be considered logic based (Leaptrott & McDonald, 2008).

Researchers have identified a number of relationships between predictor variables and System 2 reasoning. Individuals that have a greater need for cognition have a higher level of motivation to collect information and to utilize the effort necessary to analyze it, thus, engaging in System 2 processing. System 2 will be activated when individuals have the capacity and the motivation to engage in effortful processing. Stanovich and West (2000) propose that individuals with higher levels of intelligence utilize System 2 processing more than individuals with lower levels of intelligence. Evidence indicates that measures of general intelligence are affiliated with all the sub-processes of mentality that have been conceived as determinants of cognitive capacity. As evidenced in the study by Stanovich and West (2000), participants that made belief biases, which were caused by System 1, scored lower on tests of general intelligence. Whereas, individuals with higher levels of cognitive ability evaluated syllogisms analytically, thus, leading to correct performance.

Evidence of the relationship between intelligence and System 2 processing is also portrayed in studies involving the development of reasoning in children and adolescents. Studies demonstrate that System 2 processing is more strongly linked to a child’s age and measured intelligence than System 1 processing (Evans, 2003). Further complementary evidence also shows that System 2 functioning, relative to System 1, declines in old age. Additionally, it has been proven that working memory capacity, which is known to be closely related to general intelligence scores, is a good predictor of analytic reasoning ability (Evans, 2006; Stanovich & West, 2000). It is assumed that the inhibitions of the heuristic system and the computations of the analytic system draw on limited executive working memory resources; therefore, the more resources that are available, the more likely the analytic system will be successfully engaged and the correct response will be calculated (De Neys, 2006).

Differences in cognitive ability result from the two systems cuing different responses. There are two different types of intelligence: analytic intelligence, which is measured by psychometric tests (e.g., Scholastic Aptitude Tests); and interactional intelligence, which is pragmatic in
nature (Osman, 2004). Individuals that possess higher levels of cognitive ability are able to activate analytic processes and avoid the temptation of relying on simple heuristics that would be unsuitable for specific reasoning. On the other hand, individuals that do not perform as well are more likely to rely on heuristics readily available in System 1.

Kahneman (2003) suggests that there is a positive correlation between System 2 cognitive processing and an individual’s exposure to statistical thinking and possession of analytical tools. Analysis of judgment implies that statistical training does not eliminate the use of heuristics; however, it does enable individuals to avoid some biases under favourable circumstances. Additionally, Kahneman (2003) suggests that time pressure and concurrent involvement in multiple cognitive tasks may inhibit System 2 reasoning. Studies have also indicated a relationship between mood states and System 2 processing, where an individual in a negative mood state, especially sadness, tends to process information more systematically (Alter et al, 2007).

The assumption that preferences are not affected by different representations of the same option, also known as invariance, is violated in demonstrations of framing effects. Studies have indicated that framing effects are reduced for individuals that display a higher need for cognition. Individuals that possess a more active System 2 have a greater likelihood of noticing the relationship between the two versions and to ensure the consistency of their responses to them (Kahneman, 2003).

Understanding what situations System 1 processing is engaged and what situations System 2 processing is activated is critical for understanding human decision making because the use of different processing systems may result in different decisions. A useful indicator of whether a mental process is System 1 or System 2 would be to look at the effect of concurrent cognitive tasks. The overall capacity for mental effort is limited; therefore, effortful, System 2 processes tend to disrupt each other, whereas effortless, System 1 processes do not create much interference when combined with other tasks (Kahneman, 2003).

Accessibility is referred to as the ease with which particular mental contents come to mind and is determined by the characteristics of the cognitive mechanisms that produce it and by the
characteristics of the stimuli that evoke it. Highly accessible impressions produced by System 1 control judgments and preferences, unless overridden by the deliberate operations of System 2 (Kahneman, 2003). The level of difficulty experienced when processing information can be used as a cue to guide an individual’s subsequent processing styles (Alter et al., 2007). When information is processed easily, then the intuitive System 1 will guide judgement. On the other hand, when information is processed with difficulty, this is a cue that an individual’s intuitive responses may be incorrect and insufficient; therefore, activating the more elaborate System 2 processing. Additionally, CRT studies have shown evidence that disfluency activates System 2 processing; therefore, enabling an individual to overcome their invalid intuitions and answer questions more correctly.

Dual system theories of reasoning have been used widely by developmental, cognitive and social psychologists to explain diverse phenomena such as persuasion, social cognition, self-perception, causal attribution, stereotyping, overconfidence, and various memory phenomena (Alter et al., 2007). The notion that what is not implicit and automatic is conscious and controlled also serves as the foundation in studies of attention and motor control (Evans, 2006). Despite the numerous uses and benefits of dual system processing there are criticisms surrounding this concept, which will be discussed in the following section.

**Computational Models of Analogy Making**

There are a number of arguments against the existence of dual system processing. Support has been shown for a single system framework, in which the principle argument involves the inadequacy of the dichotomy of dual process theories to accommodate for the range of processes identified in studies of reasoning (Osman, 2004). Osman (2004) also indicates that the criteria used to distinguish between the two systems does not take into consideration examples of implicit and explicit processing that involve the acquisition and application of simple and complex rules. Arguments have been made that a problem exists in regards to labelling all forms of cognitive processes that are not in System 2, as belonging to a single alternative system, System 1 (Evans, 2006). It has been proposed that different forms of
cognition occur along a continuum, in which intuitive processing is at one end and analytic processing is at the other.

The Fluid Analogies Research Group (FARG) is a research group that studies cognitive sciences and has two main goals and objectives: to develop detailed computer models of concepts and analogical thinking in carefully designed, highly restricted microdomains; and to observe, classify, and speculate about mental processes (Hofstadter, 1995). FARG has developed a number of computational models of analogy making in which the basic architectural principles were illustrated by Hofstadter (1995). This family of computational models include: the Seek-Whence Project (Hofstadter, 1995), Jumbo (Hofstadter, 1995), Numbo (Defays, 1995), Copycat (Hofstadter & Mitchell, 1995), Tabletop (French, 1992), Letter-spirit (McGraw, 1995), and Metacat (Marshall, 1999). As indicated by French (2002), there are three important characteristics of these models for analogy-making, which include: their ability to build up their own representations of the source and target, in addition to mapping between them through an agent-driven interaction between top-down and bottom-up processing, their use of parallelism, and their stochastic nature. This family of models allow representation building and mapping to run in parallel and to influence each other. Partial-mappings are able to have an influence on further representation building; therefore, allowing the gradual construction of representations.

The Seek-Whence project arose in the late 1970’s and forms the basis to the entire approach to the mind on which FARG’s research is based. Jumbo was the first of FARG’s computer projects that was brought to a reasonable level of realization. Jumbo was concerned with the types of cognitive mechanisms that allow individuals to figure out anagrams quickly and almost effortlessly in their heads. Numbo, a cousin to Jumbo, was developed by Daniel Defays and is a model of how individuals investigate different arithmetical combinations of a few given numbers in trying to reach a given target number. Copycat is a computer program that is designed to discover insightful analogies in a psychologically realistic way (Hofstadter & Mitchell, 1995). The goal of the Letter Spirit project is to model central aspects of human high level perception and creativity on a computer (McGraw, 1995). Metacat is an extension of the
Copycat analogy making program developed by Hofstadter and Mitchell, and was developed as a model of the complex interplay between bottom-up and top-down perceptual processes in the mind, which enable humans to perceive analogies between different situations (Marshall, 1995). Tabletop is a computer program that models human analogy making in a micro world consisting of a small table covered with table objects (French, 1992).

Silva and Linhares (2007) argue against the framework that suggests little or no interaction between System 1 and System 2 processing and they propose that intuition plays an important role in guiding the reasoning processes through the use of subconscious judgments. In the paper by Silva and Linhares (2007) they state that the difference in response types between System 1 and System 2 can be explained by a parallel computational architecture of the system known as Numbo. This program seeks to simulate the human ability to discover patterns and to structure concepts of fluidity, independently of any problem-solving context (Defays, 1995). Numbo was created to clarify the relationship between perception and cognition and is based on the number game known as Le compte est bon, which has the objective of constructing a given target number from a set of five other numbers (bricks) using only addition, subtraction and multiplication.

This system has three primary components: a spreading-activation network that encodes the permanent knowledge needed to solve the task, a working memory where all the problem solving activities take place, and a set of codelets, which are small operators that encode the needed procedural knowledge (Defays, 1995).

In Numbo a network, known as the Permanent network (Pnet), is used to encode the rote declarative knowledge needed in the game. The Pnet encodes additive and multiplicative decompositions of three types of numbers: small integers; landmark numbers, such as 10, 20,30,... 100; and salient numbers, which are numbers that individuals just happen to be familiar with. Nodes representing integers are not the only nodes in the Pnet; nodes labelled addition, subtraction, multiplication, and similar are also contained in the Pnet. Nodes are connected together by links, which contain labels indicating the type of relationship it encodes. During processing each node has a certain degree of activation, which is determined by
Numbo’s current interest in that node. Activation spreads from one node to its surrounding nodes in a non-uniform manner, where certain links will be more susceptible to transmit activation than others depending on intrinsic factors and the context. A link’s ability to transmit activation is called its weight. The more highly activated a label is the greater the weight of each link it labels.

The cytoplasm is where all the constructing and de-constructing of temporary structures takes place and this term can be thought of in terms of a working memory. Distributed, parallel computations take place in the cytoplasm; thus, several actions can take place simultaneously. Acting under the influence of the Pnet, codelets create small network fragments, which reside in the cytoplasm. These network fragments are like temporary copies of specific parts of the Pnet and can be altered with new nodes and links, which is all produced by the actions of codelets. At the beginning of a run, a node that represents the target is put into the cytoplasm. After this, bricks are randomly read in and for each brick a new node is added. The brick nodes then interact with one another and with the target node. Different types of interactions carried out by the codelets can occur between these nodes. Interaction types include: grouping of bricks into blocks, de-construction of blocks into more elemental pieces, production of new secondary targets, and bonding of bricks, blocks, and targets. The Pnet and the cytoplasm are composed of the same types of components; therefore, the Pnet can act on the cytoplasm by downloading pieces of its structure. In this sense, permanent knowledge does not have to be restructured before being used. The nodes contained in the cytoplasm (cyto-nodes) have three important parameters that characterise them: type, status, and attractiveness.

The cytoplasm is characterized by temperature and the closer the system is to finding a solution, the more it will decrease the temperature. This decrease in temperature will reduce the chances of significantly changing any of the structures in the cytoplasm. The decrease in temperature is not monotonic because many instances may occur where roadblocks are encountered; therefore, the construction of a structure does not monotonically become more complete over time (Silva & Linhares, 2007). When the temperature is higher, dismantling codelets are produced to de-construct blocks and secondary targets. Temperature is not
controllable by the user but instead acts as a feedback mechanism to the system, which has the ability to reorganize itself by accepting or rejecting changes as temperature allows (Silva & Linhares, 2007). The temperature takes into account the attractiveness of the nodes, the number of free nodes, and the number of secondary targets.

The codelets have the ability to act on the contents of the working memory to access or modify data structures, to create other codelets and place them on the Coderack, and to increase or decrease activation of specific nodes in the network. All of the processes of the system are conducted by the codelets and are probabilistically selected from the Coderack. Each codelet on the Coderack is assigned an urgency and the likelihood of the codelet being chosen is proportional to its urgency; however, when competing codelets are simultaneously waiting on the Coderack, there is no guarantee which one will be selected first.

Silva and Linhares (2007) compared the trajectories of thought due to System 1 and System 2 response types and from this they concluded that the same underlying subcognitive mechanisms account for both System 1 and System 2 response types. Evidence in support of this theory comes from cognitive computational modeling, in which all the mechanism they claim to act during System 1 and System 2 problems possess a solid base in the literature, more specifically in the system Numbo. Silva and Linhares (2007) compared the difference between a System 1 type response and a System 2 type response using Numbo. In the System 1 type response, Numbo arrived at an answer to the problem using only the information stored in the Pnet; therefore, the system did not require any calculations. They claim that this immediate, no calculation information processing is a very close approximation of intuitive human responses. In the System 2 type response, Numbo carried through with calculations and explored rival pathways until finding a definitive answer.

In a System 2 type response, the temperature decreases in a non-linear way; therefore, causing a chain of nodes to be activated. On the other hand, in a System 1 type response, the temperature is decreased rapidly due to the rapid activation of conceptual nodes, and a solution is found quickly; however, this may not be the optimal solution. In a System 2 response, a much larger quantity of nodes are activated, which all compete for attention in the
parallel working of the architecture; therefore, causing the system to engage in longer information processing. In System 1 type problems, it may be possible that people quickly activate conceptual nodes to high levels, thus, causing the temperature to drop in a very limited amount of time.

Silva and Linhares (2007) argue that two separate, distinct systems do not exist, but instead a coupling exists between the subcognitive processes operating concurrently under the intuition (System 1) and reason (System 2) systems. In both System 1 and System 2 type responses pressure perceiving processes operate concurrently in multiple levels and these processes activate nodes in the Pnet. Additionally, structures are created in the cytoplasm and the temperature gradually decreases. The distinction between System 1 and System 2 would be the premature decrease in temperature in the System 1 type response. A System 2 response would occur when the initial structure created after a quick drop in temperature is suppressed. According to Silva and Linhares (2007), it is not the activation of System 2 that would bring about a particular response type, but instead it would be the premature convergence of temperature, which leads to a smaller degree of activation of processes that are associated with System 2 type responses.
3. VAGUENESS AND THE DECISION MAKING PROCESS OF AUDITORS

The purpose of this section is to utilize the material outlined in the literature review and to create a link between the decision making process of auditors and vagueness in accounting standards. The problem of vagueness in accounting has been emphasized by many authors and it has been argued that the neglect of this issue may cause accounting information and analysis to be less useful (Zebda, 1991). This section makes the argument that, due to the decision making process of auditors, the vagueness inherent in accounting standards may not create as significant of a problem as previously believed.

3.1. DECISION MAKING PROCESS OF AUDITORS

Managers and accountants are required to make numerous judgement decisions when choosing appropriate accounting policies, making suitable accounting estimates, and deciding what information should be disclosed in the notes and the financial statements. Auditors also have the responsibility of exercising their own professional judgment when collecting and evaluating audit evidence to determine whether or not the financial statements accurately reflect the intent of the accounting standards (Messier et al., 2008). Managers, accountants, and auditors all utilize accounting standards that contain vagueness. This inherent vagueness may allow for biases to occur in the decision making process of managers, accountants and auditors.

The auditing profession is imbibed in the assumption that the auditing process can be impartial and free of bias and that any biases encountered in the client’s books can be successfully countered by the auditor (Marnet, 2005). Many events have altered this assumption and concerns have risen regarding the impartiality and absence of bias in the auditing process.

Many studies have been conducted to investigate the presence of heuristics and biases in auditor decision making processes; however, as indicated by Shanteau (1989), accounting researchers have had difficulty translating the Kahneman and Tversky demonstrations into an
auditing framework. Behavioural auditing reports of both biased and non-biased behaviour have been made (Shanteau, 1989). Some studies, such as those conducted by Marnet (2005), Moore, Loewenstein, Tanlu, and Bazerman (2002) and Joyce and Biddle (1981a), indicate the existence of heuristics and biases, which have an influence on the decisions made by auditors. Other studies, such as those conducted by Shanteau (1989), Nelson and Tan (2005) and Shields, Soloman, and Waller (1987), indicate that heuristics and biases do not exist or if they do exist they are present on a much lesser scale.

As previously mentioned incentives may affect an auditor’s decision making process and can have a significant influence on the outcomes of an audit. According to Marnet (2005), evidence indicates that auditors find it difficult to remain impartial even in the absence of financial incentives, which is mainly attributable to the presence of bias as the result of close working relationships with their clients. Biases are an inevitable result of working closely with clients and often intrude unconsciously; therefore, influencing the outcomes of an audit. The close working relationships with clients may introduce bias into the perception, interpretation and judgments of professionals involved in the audit. Moore et al. (2002) posit that the intrusion of bias prevents an auditor from being impartial and completely independent.

In a study performed by Moore et al. (2002) the results provided support of auditors’ vulnerability to unconscious bias during the auditing process, which may compromise auditor independence. The study also indicated that it takes very little to produce bias and even when auditors were aware of their vulnerability to bias, they underestimated it and therefore did not adequately correct for it. Moore et al. (2002) also provided evidence that social ties between auditors and their clients may be more of a problem than financial incentives.

The experiments performed by Joyce and Biddle (1981a) also provided evidence of the existence of heuristics in the auditor decision making process. The results of the study indicated that at times auditors make judgments that are not in accordance with normative principles of decision making. These violations can sometimes be accounted for by the anchoring and adjustment heuristic; however, it was indicated that some other heuristics may also be at work.
Due to their study of statistics and common usage of statistical methods and sampling techniques, auditors may have higher than average quantitative skills; however, this training may be applied only where its relevance is fairly obvious. As evidenced in a study by Holt (1987), auditors appear to integrate base rates and case specific evidence less normatively than student population subgroups. This study also indicated that auditors become less normative with experience. An auditor’s familiarity with an environment may hinder their ability to learn correct decision rules. Additionally, auditors may draw on stereotypes from their memory and be more confident in their categorizations than less experienced judges (Holt, 1987).

A comprehensive review of audit judgment research reveals the presence of heuristics and biases related to anchoring, calibration, base-rate neglect, representativeness, sensitivity to sample size, confirmatory bias, and source credibility (Nelson & Tan, 2005). Additionally, auditors that bring to bear on an audit task their individual characteristics, such as knowledge, ability, personality, and cognitive limitations, are susceptible to judgmental biases.

As indicated by Marnet (2005), auditors are subject to the same biases and cognitive limitations as other human beings and are therefore subject to the same self serving motivations and cognitive shortcomings. Auditors, similar to other individuals, are subject to the common human preferences for immediate gratification, typically with insufficient regard for potential negative consequences in the future. These preferences may ultimately result in biased decision making. It is ideal that an auditor’s concern for their reputation serves as an incentive for auditors not to deviate from performance expectations; however, this does not always occur.

The unconscious biases faced by auditors are a problem in the sense that it can significantly influence the outcomes of an audit. It is important for policy makers to find ways to minimize these biases, which has been attempted through the mandatory requirement of auditor rotation; however, this is unlikely to eliminate the biases altogether (Marnet, 2005).

Many studies that do report findings of the presence of heuristics and biases indicate a much smaller effect than those reported by Kahneman and Tversky, which suggests that this superior performance by auditors may be attributable in part to their acquisition of professional skills
(Shanteau, 1989). Some authors have made the general conclusion that while evidence suggests that auditors do employ heuristics and are susceptible to biases, they exhibit a lesser amount of bias than do students in the psychology literature when performing realistic auditing tasks (Nelson & Tan, 2005). The results of the study performed by Shields et al. (1987) also provided evidence that auditors’ judgments are less prone to biases than most subjects in psychological experiments. Joyce and Biddle (1981b) also indicated that auditors underutilized base rates in comparison to normative standards; however, auditors did better than student subjects.

Contrary to studies that identify the presence of judgment biases in all auditor decision making, there is evidence that indicates that auditors are susceptible to the use of heuristics and biases when faced with everyday problems; however, when presented with accounting related decisions, the presence of these biases are reduced. As indicated by Shanteau (1995) studies of heuristics and biases in accounting and auditing literature conclude that auditors show considerable bias when presented with unfamiliar, student-like problems; however, when the expert subjects were presented with experimental tasks that were more analogous to typical audit judgments, heuristic and biases were often not found or were significantly mitigated. Additionally Shanteau (1995) stated that biases that were found to exist in other research are not evident in the judgments of professional auditors.

As indicated above, different literatures make different arguments regarding the existence and impact of heuristics and biases on the decision making process of auditors. Some studies have indicated the presence of biases in all auditor decisions, some studies have indicated the reduction of biases in only accounting related decisions, and some studies have argued against significant biases in any auditor decisions. There appears to be a lack of progress on theory development related to heuristics and biases in behavioural auditing studies; however, according to the results reported in many of the studies that have been conducted, the results appear to be close to normative (Shanteau, 1989).
3.2. ARE VAGUE ACCOUNTING STANDARDS A PROBLEM?

The fact that vagueness does exist in accounting standards is undeniable and many authors have acknowledged this vagueness and the corresponding problems.

According to Penno (2008), the accounting framework is based on rules and much like rules in law and society in general, these rules contain “gray zones”. The problem of vagueness is persistent in all rule systems, which indicates that decisions cannot be objectively described as simply “right” or “wrong”, but instead will be based on an authority’s judgement.

Zebda (1991) emphasizes the importance and the extensiveness of the problem of ambiguity and vagueness in accounting and auditing and argues that the neglect of this issue may cause accounting analysis to be less useful. Despite the fact that vagueness is a major source of inexactness in many accounting decision problems, accountants have treated vagueness as if it does not exist. By neglecting vagueness in the accounting environment, this may restrict the applicability and limit the usefulness of accounting models by impairing their descriptive and/or predictive ability.

Accounting is considered to be unbearably imprisoned with technical and conceptual ambiguities and vagueness. According to Zebda (1991), the statements, terms, and rules frequently used by accountants reveals that vagueness exists in many accounting problems. Vagueness in accounting standards may limit the informative nature of the accounting information. Additionally, uncertainty and judgement are both inherent in the financial reporting and auditing professions.

A word search, performed by Penno (2008), of the FASB’s Statements of Financial Accounting Concepts No. 1-7 and the FASB’s (2006) Preliminary Views: Conceptual Framework for Financial Reporting reveals four instances of the word “vague” or “vagueness”; therefore, indicating that the FASB has recognized the problem, but the overall acknowledgement is limited. Penno (2008) stated that upon review of the texts, the view expressed of vagueness appears to be somewhat negative. The framework does not incorporate the vagueness concept directly, but
instead it does so indirectly by making more frequent use of the vague terms reasonable and substantial.

According to Zebda (1991), vagueness should not be ignored in accounting for many reasons. First of all, it represents a major source of inexactness in accounting and auditing decisions and it may influence those decisions. Secondly, the assumption of binary classification of accounting objects and the Law of Excluded Middles are unjustifiable, which may lead to unrealistic representations of accounting decision problems and to non-intuitive and unacceptable conclusions. Finally, precise numerical inputs to accounting decision analysis are difficult if not impossible to obtain. The neglect of vagueness in decision analysis may cause the analysis to be incomplete, unrepresentative and irrelevant.

Accounting standards are embedded with vagueness; however, does this vagueness present a problem in the accounting and auditing environment? Many authors have suggested that vagueness in accounting standards negatively influence the decision making process of accountants and auditors; therefore, reducing the informative nature of accounting information. As evidenced in numerous accounting literature, accounting standards do contain vagueness; however, perhaps this vagueness does not create as large of a problem as believed by many authors.

Literature has been previously presented regarding dual system processing, which identifies System 2 reasoning as a slow, effortful, logic-based process that requires a greater use of appropriate information and analysis. Decisions are considered logic based if they are made carefully after much information search, consultation, analysis and evaluation of alternatives. This type of decision making is correlated with the information processing of accountants and auditors. When faced with situations that require decisions to be made, accountants and auditors search for and obtain as much information as deemed necessary to perform a thorough analysis and to reach an appropriate solution. System 2 reasoning requires a greater use of appropriate information and analysis, and a greater use of System 2 reasoning by the decision maker will result in better solutions to more complex problems. Accounting and auditing decisions are generally not made in a stringent time period or with little information
search and analysis, which is associated with System 1 type reasoning. Generally when System 2 reasoning is engaged, which is the case in most accounting and auditing decisions, a more comprehensive, bias free solution is achieved.

According to Kahneman (2003), System 2 is always involved in judgments, which are always intentional and explicit. Considering the fact that most accounting decisions require the use of auditor judgment, especially in cases where vagueness exists, System 2 processing is generally engaged for these decision processes. System 2 processing is typified as controlled processing and encompasses the process of analytical intelligence, which results in more superior, in-depth solutions to complex problems.

The probability of correcting an error in System 1 reasoning is reduced when people are under cognitive load or respond quickly (Alter et al., 2007). In the case of accounting decision making, the decision process is normally a slower process; therefore, if errors do occur due to System 1 reasoning, System 2 is likely to compensate for and correct these errors. Additionally, errors in System 1 reasoning are more likely to be corrected when individuals are held accountable for their decisions (Alter et al., 2007), which is the case in both accounting and auditing environments.

When faced with ambiguous situations, middle managers frequently consult with other individuals for support and guidance. The degree of logic-based reasoning employed by the individual may be related to the quantity and quality of consultation they receive from other individuals. During the audit process auditors interact with their client’s staff and colleagues within their own firm, which creates knowledge and information sharing and is highly beneficial to reducing individual judgment biases. During the audit process, a judgment bias of one individual, no matter whether it is conscious or unconscious, is likely to be noticed and corrected by the auditor himself or another colleague.

Individuals are more likely to use analytic tools that have been introduced to them through formal education; therefore, an individual would have to develop these tools independently before being able to use them. As indicated by Kahneman (2003), a positive correlation exists between System 2 processing and an individual’s possession of analytical tools. Auditors,
through both formal education and training, are exposed to numerous different analytical tools; therefore, auditors should engage in a greater level of System 2 processing than an average person.

The perception of difficulty of a problem is also correlated with System 2 processing. According to Atler et al. (2007) the perception of difficulty leads individuals to overcome their intuitions and engage in System 2 processing. The accuracy and precision of accounting information is not always fixed; therefore, some judgments are more difficult to make than others. Vague accounting standards increase the difficulty of making judgments, which may result in a greater use of System 2 processing. When accountants and auditors are faced with a difficult situation they will employ System 2 processing; therefore, resulting in a more systematic problem solving process and a better solution.

Vagueness is an inherent phenomenon and is not resolvable because vagueness is intrinsic to the language (Devos, 2003). In alignment with this perspective, Davie (2000) stated that accounting representations have limits that make the possibility of accounting with no vagueness unattainable. Vagueness in accounting and auditing is unavoidable and many authors have suggested that this inherent vagueness creates a major problem in the decision making process of accountants and auditors. Vagueness may also allow for the introduction of biases and heuristics into the decision making process. Furthermore, authors have claimed that vagueness limits the informative nature of accounting information, creates a source of inexactness in accounting and auditing decisions, and may lead to an unrepresentative, irrelevant, and incomplete analysis.

It is apparent that vagueness does exist in the accounting and auditing environment; however, the impact of this vagueness on the decision making process of accountants and auditors may not be as negatively significant as many authors have previously believed. As indicated above, there is evidence that suggests that auditors and accountants engage in a high level of System 2 processing when faced with accounting related decisions. In the presence of vague accounting standards, auditors and accountants can overcome the negative repercussions of this vagueness by engaging in System 2 processing, which increases the use of analytical thinking.
and achieves more thorough, comprehensive solutions to complex problems. Vague accounting standards may allow for biased decision making. The use of System 2 processing reduces the biases that occur due to System 1 heuristic processing; therefore, mitigating the effect of vague accounting standards on the decision making process of auditors and accountants. If auditors really do use System 2 processing to solve accounting related problems, then the vagueness inherent in accounting standards should not affect the informative nature of accounting information; therefore, not creating as significant a problem as many people believe.

As has been previously indicated, vagueness may not create as significant of a problem in the decision making process of auditors and accountants and attempting to eliminate this vagueness may even prove to be more problematic. As a set of procedures for creating visibility and understanding, accounting is supposed to reduce the inherent vagueness through its conceptual and technical specificity and precision (Davie, 2000). The very act of attempting to reduce vagueness in accounting produces the ultimate source of indecision and uncertainty. Additionally, as indicated by Zebda (1991), vagueness has several advantages in complex, changing business environments, and high levels of precision are not necessary for an effective analysis because people are able to understand and respond to imprecise instructions.

Based on the argument presented above, our motivating question is: Does vagueness create a problem for experts’ decision making?

Considering the fact that this question is too broad and that our subject is accounting, the following research question has been developed: Does vagueness in accounting standards create a problem for auditors’ decision making?

Aiming to answer this question, the following research design has been proposed:

1) test auditors’ use of heuristics on non-vague, non-accounting problems. This could be accomplished by using the following bat and ball question from the Cognitive Reflection Test conducted by Frederick (2005).

A bat and ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? ____ cents
The following hypothesis could be tested:

\[ H_0: \text{Auditors respond the same as previous subjects ($1.00 for the bat and 10 cents for the ball), using System 1 processing and arriving at an incorrect answer.} \]

2) test auditors’ use of heuristics on vague accounting problems (like classification of assets, revenue recognition, recognition of contingent liabilities)

The following hypothesis could be tested:

\[ H_0: \text{Auditors’ responses to these questions are different from their previous responses; instead of using System 1 processing they use System 2 processing and arrive at the correct answer.} \]

By conducting an experiment to test these hypotheses, a determination can be made as to whether or not vague accounting standards create a problem for the decision making process of auditors. In accordance with the argument presented above, we predict that auditors will respond in a similar manner to other subjects when faced with a non-accounting related question (such as the bat and ball question); therefore, using System 1 processing and being subject to the use of heuristics and biases. Additionally, we predict that when faced with an accounting related question, auditors will use System 2 processing; therefore, reducing the use of biases and heuristics. This will mitigate the effect of vague accounting standards on the decision making process of auditors and enable them to arrive at the correct answer to the problem.
4. CONCLUDING REMARKS

The primary purpose of this paper is to examine the decision making process of auditors and to investigate whether vagueness in accounting standards negatively affects the decision making process of auditors. It is important to examine and understand auditor judgment and decision making as it affects the quality of an audit. Additionally, the trend in the audit practice is for an increasing role of judgment in the audit process (Knechel, 2000).

Decision making theories of RCT and bounded rationality were discussed. RCT assumes that individuals are rational people that engage in cost-benefit analysis of each alternative before opting for the choice that maximizes their overall profit while minimizing their overall costs. Many implausibility problems are associated with RCT; therefore, the theory of bounded rationality was developed as an alternative to RCT. Bounded rationality makes the assumption that individuals are goal oriented while taking into consideration the limitations of decision makers in attempting to achieve these goals. The world is unquestionably complex; therefore, making it impossible for individuals to acquire and process all the information necessary in certain situations to make in-depth cost-benefit analysis of every single alternative. Due to the complexity of the world and to the limited cognitive processing capacities of humans, individuals often take mental shortcuts by utilizing heuristics and biases to solve complex problems.

The topic of heuristics and biases associated with the decision making process was explored in further detail through the discussion of the theory of dual systems processing. A number of studies have been conducted to investigate the dual systems of processing. Two different systems, System 1 and System 2, have been proposed and these dual systems have contributed to explaining individual's rational thinking failures by suggesting two different human reasoning systems (De Neys, 2006). System 1 is characterized as a fast, automatic, effortless reasoning process; whereas, System 2 is characterized as a slow, effortful, logic based process (Stanovich & West, 2000).
Alternative theories to the dual systems theory were explored. A number of computational models of analogy making have been developed by the Fluid Analogies Research Group. An emphasis was placed on the computational model known as Numbo, which was created to clarify the relationship between perception and cognition. Using Numbo, Silva and Linhares (2007) compared the differences between System 1 and System 2 type responses and argued that two separate, distinct systems do not exist, but instead there is a coupling between the subcognitive processes operating concurrently under the two systems.

Many studies have been conducted to investigate the presence of heuristics and biases in the decision making process of auditors. It is important to determine whether or not auditors are subject to the use of heuristics and biases during the audit process as this will affect the quality and outcome of the audit. Some studies, such as the one performed by Moore et al. (2002), indicate the vulnerability of auditors to unconscious biases during the audit process. While other studies, such as the one conducted by Shanteau (1995), indicate that auditors’ judgments are less prone to biases than student subjects, especially when faced with accounting related problems.

Over the past years, there does not appear to have been much advancement in theory development related to heuristics and biases in behavioural auditing studies. Numerous theories and concepts have been borrowed in behavioural auditing research; however, very few original theories have been developed (Shanteau, 1989). The study of heuristics and biases appears to have been of limited relevance for behavioural auditing; therefore, posing a major problem with borrowing theories from other disciplines, such as psychology and other behavioural sciences. According to Shanteau (1989), the results of other studies have failed to provide consistent effects attributable to heuristics and biases and it is not clear that heuristics and biases are connected to central issues in behavioural auditing.

It is believed by many theorists that any conceptual framework in accounting must acknowledge vagueness and that this vagueness has a negative effect on the decision making process of accountants and auditors (Zebda, 1991). Previous literature has suggested that the inherent vagueness present in accounting standards create a problem for the decision making
process of auditors; however, in this paper, I have proposed that the use of System 2 processing by auditors may mitigate the negative repercussions associated with vague accounting standards. Furthermore, the presence of vague terms in accounting standards discourages accountants and auditors from accessing the System 1 processing, driving them to better decisions.

This argument, that the use of System 2 processing by auditors counteracts any negative effects of vague accounting standards, is in alignment with the idea that heuristics and biases may not be connected to central issues in behavioural auditing (Shanteau, 1989).

There is an abundance of evidence to support the argument that auditors engage in System 2 processing during the audit process. Auditors engage in thorough information search, analysis and evaluation of alternatives, which is characteristic of System 2 reasoning. Accounting and auditing decisions are generally made in non-stringent time frames; therefore, if errors occur due to System 1 processing, System 2 is highly likely to compensate for and correct these errors. Accountants and auditors are held accountable for their decisions and this accountability increases the probability of utilizing System 2 reasoning. System 2 is always involved in judgment; therefore, considering the fact that accounting and auditing decisions generally require the use of individual judgment, it is highly likely that System 2 processing is utilized in these decisions. Auditors are exposed to numerous analytical tools, either through education or formal training, and a positive correlation has been found between System 2 processing and an individual’s possession of analytical tools (Kahneman, 2003). As can be seen by the examples presented, System 2 processing plays an important role in the decisions made by accountants and auditors.

When faced with accounting related decisions, auditors and accountants can overcome the negative repercussions of vague accounting standards by engaging in System 2 processing, which increases the use of analytical thinking; therefore, resulting in more comprehensive solutions to complex problems. Vague accounting standards may allow for biased decision making. By engaging in System 2 processing, the biases associated with System 1 heuristic
processing are reduced; therefore, mitigating the negative effects of vague accounting standards.

As a suggestion for further research, I have proposed a research design and associated hypotheses to investigate the question of whether or not vagueness in accounting standards create a problem for auditors’ decision making processes. By testing the research question, does vagueness in accounting standards create a problem for auditors’ decision making?, the question of whether or not auditors engage in System 2 processing during accounting related problems can be answered. If the study provides support for the concept that System 2 processing is indeed utilized to solve accounting related problems, then the argument that vague accounting standards do not pose a significant problem in auditors’ decision making processes can be further solidified. By exploring the connection between auditors’ decision making processes and use of heuristics and biases on non-vague non-accounting problems and vague accounting problems, it can become clearer as to whether vague accounting standards really do pose a problem in the accounting and auditing settings. There is much debate surrounding the influence, both positive and negative, of vague accounting standards; therefore, understanding whether this vagueness has any affect on the decisions of auditors and accountants can prove to be highly beneficial.
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