

“Heuristics or experience-based techniques for making accounting judgments and learning”

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SECTION 3. General issues in management

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Heuristics or experience-based techniques for making accounting judgments and learning

Abstract

The purpose of this paper is to further the development of initial accounting for internally generated intangible assets, relevant to both academics and practitioners, examining what happens when accountants are given principles-based discretion. This paper draws on existing insights into heuristics or experience-based techniques for making accounting judgments. Knowledge about judgment under uncertainty, and the general framework offered by the heuristics and biases program in particular, forms the underlying logical structure. An interview study concerning initial accounting for internally generated intangible assets in the consumer goods and services sector provides the empirical base for the analysis and discussion. Identifying and recognizing internally generated intangible assets is a typical case of judgment under uncertainty. From an accounting point of view, it is vital that the judgments and intentions produced by System 1 can be modified or overridden by the deliberative operations of System 2, that is, that a direct interrelationship exists between intuition and reasoning. This indicates that heuristics are experience-based, which makes it interesting to study accounting judgments from a heuristics and biases perspective. By studying the underlying processes on which accounting judgments are founded, we can learn more about how accountants reason in relation to various accounting standards given different economic situations. One of the practical implications of this study is that accountants can gain a better understanding of how to avoid judgmental biases when tackling complex accounting problems, such as accounting for internally generated intangible assets. This paper takes a different view on heuristics and biases related to accounting judgments from that of previous research in that the focus is primarily on the use and design of heuristics and biases and to a lesser extent on departures from normative decision-making behavior.

Keywords: internally generated intangible assets, accounting judgment, learning, heuristics.

JEL Classification: M410.

Introduction

There is a general perception that principles-based accounting is more likely to result in transactions that reflect their true economic substance than is rules-based accounting. The major accounting standards today, the International Financial Reporting Standards (IFRS), are considered to be principles-based standards in that they establish broad rules as well as dictating specific treatments. Accounting principles are general decision rules derived from both the objectives and concepts of accounting, which provide a conceptual basis for accountants to follow rather than a list of detailed rules. Principles-based standards rely on accounting judgments and disclosure of the choices made, and the rationale for these choices is essential from both accountability and valuation perspectives (Psaros and Trotman, 2004). Furthermore, there is general acceptance that knowledge, skills and intangibles have become the key drivers of competitive advantage in business firms (Granstrand, 1999; Teece, 2000).

What distinguishes intangible assets is that they are unique, at least in some sense, and must be assessed individually. This holds not least for internally generated intangible assets (Upton, 2001). Judgment and decision-making (JDM) research in accounting is a

lively and rapidly changing area in accounting research (see, e.g., Ashton and Ashton, 2007; Bonner, 1999; Luppe and Fávero, 2012). JDM researchers (1) strive to measure individuals' performance when carrying out judgment and decision-making tasks; and (2) they examine the determinants of both high- and lower-quality judgment and decision-making (Bonner, 1999, p. 386). Factors that lead to lower-quality judgment and decision-making can be regarded as causes of JDM "problems", whereas factors underpinning high-quality JDM, such as learning and knowledge of what causes systematic errors in judgment, can be regarded as remedies for those "problems" (ibid.). In an accounting and financial reporting setting, errors in accounting-related JDM may have major significance at a more far-reaching level than the individual level (Ashton and Ashton, 2007; Bloomfield et al., 1999; Libby and Luft, 1993). From a preparer's perspective, individual accountants make accounting judgments, while the Board of Directors and the CEO make formal decisions regarding accounting and financial reporting. Hence, it is important to make a distinction between judgment and decision. In the view of Bonner (1999, p. 385), the term judgment characteristically refers to "forming an idea, opinion, or estimate about an object, an event, a state, or another type of phenomenon," whereas the term decision refers to "making up one's mind about the issue at hand and

taking a course of action.” This paper focuses on accounting judgments that take the form of predictions about the future, or of evaluations or assessments of a current accounting object or item, a current accounting event, or a current accounting state. More specifically, the focus is on accounting judgments that underlie the identification, measurement, recognition and disclosure of internally generated intangible items.

The rationale for this is that internally generated intangible items are considered to be difficult to accurately assess and that judgment performance needs to be improved (IASB, 2007; Upton, 2001). Another important distinction is between experiential learning (see, for example, Kolb, 1984; Schiller, 2012), and heuristics and biases (see, for example, Gilovich and Griffin, 2002; Tversky and Kahneman, 1974). Experiential learning theory portrays the process that explains accounting knowledge acquisition (Riahi-Belkaoui, 2004). Experiential learning emerges from the process of making meaning from direct experience, for example, when identifying, measuring, and recognizing internally generated intangible items. Direct experience forms the basis for reflective observation (reflection on the experience), which in turn may induce abstract conceptualization or learning from the experience (for example, in the form of heuristics). By applying what has been learned, active experimentation takes place, which, in turn, may induce a new learning cycle. Accountants and others who make judgments do not always make high-quality judgments. In many situations, judgment making reflects systematic, as opposed to random, errors (Bonner, 1999; Gilovich and Griffin, 2002; Tversky and Kahneman, 1974). Following from this, an interesting question is whether accounting judgments regarding internally generated intangible items can be improved as a result of accountants gaining increased knowledge of and insight into heuristics and biases. The purpose of this paper is to further the development of initial accounting for internally generated intangible assets, relevant to both academics and practitioners, examining what happens when accountants are given principles-based discretion. The rest of the paper is organized as follows. Section 1 consists of a literature review. Section 2 reports on an empirical study on initial accounting for internally generated intangible assets. Section 3 provides an analysis and discussion of the results. The final section concludes the paper.

1. Literature review

1.1. Truth in accounting as a point of reference for accounting judgment. It has become generally recognized that accounting does not warrant a claim to being a science capable of delivering the truth

(Littleton, 1953). One good reason for this is that the real world of business is nearly always too complicated for simple answers to questions (Vatter, 1966, p. 6). Riahi-Belkaoui (2004) argues that the accounting discipline is socially constructed and that man-made rules rely on a judgment process for both the preparation and use of accounting information. The notion of truth in accounting as neutrality implies that an accountant is expected to be neutral; that is, the accounting information prepared is to be free from bias. Representational faithfulness and completeness refer to the correspondence between accounting information and the events that the information is supposed to represent. Neutrality, representational faithfulness, and completeness produce true accounting information on the grounds that it corresponds to a fact (*ibid.*). The firm is the main party involved in the accounting process as being the preparer of accounting information (Riahi-Belkaoui, 2004, p. 164). The *raison d'être* of accounting is to respond to the needs of the users (Kam, 1990, p. 59). The objective of financial reporting, according to the International Accounting Standards Board's (IASB) Conceptual Framework (CF), is to provide financial information about the reporting entity that is useful to existing and potential investors, lenders, and other creditors in making decisions about providing resources to the entity (OB2).

Expediency is the overriding criterion of financial information. The CF discusses the qualitative characteristics of useful financial information. The primary qualitative characteristics are relevance and faithful representation, whereas comparability, verifiability, timeliness and understandability are enhancing qualitative characteristics (QC4). The IASB has predominantly followed a principles-based approach to standards setting. The Securities and Exchange Commission (SEC, 2008) concludes that International Financial Reporting Standards (IFRS) generally contain less prescriptive guidance and rely more on general principles than do US Generally Accepted Accounting Principles. The SEC (2008) acknowledges that, while reducing complexity, transitioning from rules-based to principles-based standards necessitates an increased reliance on the professional judgment of preparers and auditors. Stuebs and Thomas (2009, p. 33) further state that rules-based standards prescribe what the preparer is to do, while principles-based standards focus more on how to decide what to do. The latter may require judgment at higher levels than the former, but both require judgment at some level. That is, preparers have to fill in the gaps left by formal rules using rules of thumb based on lessons learned. Tversky and Kahneman (1971) examined systematic errors in the casual statistical judgments of statistically advanced

researchers. They observed that the intuitive judgments of these statistical experts did not follow basic statistical principles or models.

After reviewing the literature on judgment in accounting, Riahi-Belkaoui (2004) considers that no general conclusions can be derived at this stage of the research. There seems to be a need to study judgments and biases in accounting from a use and design perspective as an alternative to studying judgments and biases from a more normative decision-making behavior perspective. In this paper, accounting judgments are observed against a background consisting of what constitutes “truth” in an accounting sense; that is, qualitative characteristics and feasible standards. Generally, the IASB has to strike a balance between two conflicting requirements: limiting the discretion of the preparer in order to create uniformity on the one hand and providing flexibility to reflect factual economic events on the other. When it comes to internally generated intangible assets, IAS 38.57 provides the general framework or criteria for identifying and recognizing projects that may be applicable for capitalization (RedU 7). Within this framework, accounting judgments have to be made that reflect the unique situation of the company as well as the identified project. Studying these accounting judgments is of great interest in understanding accounting in practice in that they constitute the nucleus of accounting. A common claim is that the judgments are subjective; this stands to reason in that human experiences are subjective and judgments are based on experiences. To address subjectivity, the issues of accountability and transparency become important. Regarding accounting judgments, accountability and transparency presuppose that observations, assumptions, and preferably mechanisms (for example, representativeness, availability, and anchoring and adjustment), in conjunction with related systematic biases, are documented and made available (Ijiri, 1975, 1983).

Fama (1970) defined an efficient financial market as one in which asset prices should always reflect all available information. The efficient market hypothesis (EMH) indicates that financial markets are actually efficient according to this definition. The EMH comes in three major forms – “weak”, “semi-strong”, and “strong” – of which the semi-strong form implies that share prices adjust to new publicly available information very swiftly and in an unbiased way. The semi-strong form of the EMH has gained the most support (Hamberg, 2001; Shleifer, 2000). Kam (1990) concludes that if the semi-strong form of the EMH is true, then it is no use for companies to manipulate accounting methods to distort their financial position.

There are theoretical as well as empirical challenges to the EMH, for example, Shiller (1984) found that people do not deviate from rationality randomly, but rather most deviate in the same way. Also, as noted by Shleifer (2000, p. 19) a company’s market capitalization and its market to book ratio pose a serious challenge to the EMH, because stale information obviously helps predict returns. Although the EMH does not go unchallenged, from a strict mathematical/statistical point of view the EMH should hold in most situations.

However, given the substantial evidence against the EMH, it is reasonable to claim that investor sentiments, from time to time, may reflect correlated judgmental errors, rather than uncorrelated random mistakes. If the law of large numbers applies, then in the long run uncorrelated random errors should be leveraged out. According to Shleifer (2000), the critics of EHM have led to a new line of research – behavioral finance. Whereas the EMH focuses on regular, average observation based on large numbers, behavioral psychology describes more irregular and unique evidence, judgments made by individuals. There is a trend toward more principles-based accounting standards in that the IASB as a standard-setter prioritizes principles-based standards, acknowledging that neither a purely rules-based nor a purely principles-based system will ever exist. The main advantage of principles-based accounting is that it allows companies to prepare their financial statements as they see fit to ensure accurate disclosure of their financial position and performance. Principles-based accounting implies that a greater use of judgment will become the norm. As for rules-based standards, *ceteris paribus*, there should be a rather limited number of possible outcomes of an applied standard, otherwise the quality of the resulting accounting measurement and disclosure will not be adequate. Regarding principles-based standards, there can be a large number of different outcomes due to a large number of differences in the underlying economic fundamentals. How well the arguments reflect the underlying economic fundamentals affects the quality of the resulting accounting measurement and disclosure.

Accounting judgments are to a large extent linked to these arguments. Assuming that the financial markets are semi-strong in terms of “informational efficiency”, an interesting question is whether security prices, that is, capitalized value, reflect all publicly available information based on accounting judgments, and whether prices instantly change to reflect new public information based on accounting judgments. That is, can the financial markets correctly interpret accounting information that is based on arguments allegedly reflecting the underlying econo-

mic fundamentals? To continue on the path of semi-strong information efficiency, Kam (1990) claims that whether an item appears in the body of the financial statements or as a note to the financial statements makes little difference. Hence, according to Kam, there is no framing effect related to notes. Kahneman (2002) asserts, however, that framing effects related to judgments arise when different descriptions of the same problem highlight different aspects of the outcomes. From this perspective, it is interesting that the staff of the Financial Accounting Standards Board (FASB) has cooperated with the staffs of the European Financial Reporting Advisory Group (EFRAG), the Financial Reporting Council of the United Kingdom (FRC), and the Autorité Des Normes Comptables of France (ANC) in developing an invitation to comment on a discussion paper addressing a disclosure framework related to notes to financial statements. The disclosure framework described in the Invitation to Comment is based on the idea that excessive disclosure is onerous to reporting entities and can overwhelm users or lead them to overlook important information, and that improving disclosure effectiveness will require considering the information content of the notes and the understandability and ease of accessing that information.

The FASB (2012, p. 3) suggests that information with the following characteristics meet the objective of improving disclosure effectiveness: (a) it is unique to an entity or its industry; (b) it is not already apparent from financial statements or readily available from public sources to which users could be expected to have access; (c) it could make a material difference in assessments of future cash flow prospects. If the ideas presented in the Invitation to Comment are implemented, they could significantly change the way that disclosure requirements are set and the way that reporting entities determine the content, format, and organization of notes to financial statements (FASB, 2012, p. 8). From a judgmental perspective, matters such as how to tailor disclosures to fit the circumstances of individual reporting entities and how a reporting entity might determine whether each potential disclosure is relevant in its circumstances are of particular interest in that they refer to the unique situation of the entity. There is a question in terms of whether investors can interpret all the information in notes accurately given the unique circumstances of the entity, which is typically the case when it comes to accounting judgments. Here accountability plays an important role. In the short run, it is hard to know in detail how balanced and accurate the disclosed accounting judgments are, but reviewing the arguments and judgments in retrospect, the user of financial statements can form a

grounded opinion about the accuracy of the accounting judgments disclosed in notes to the financial statements. Some experiential learning (Kolb, 1984) has to take place in order to assess the usefulness of the information accurately. This adds to the perception that financial markets can be biased in the short run, but are more accurate in the long run. Thus, increased application of accounting judgments may contribute to the image that financial markets are efficient in the long term.

1.2. Judgmental heuristics. It has been found that heuristics often tend to produce more successful choices and actions than complex rational analyses (Gigerenzer, 2007), or more precisely, judgment under uncertainty is often based on a limited number of simplifying heuristics rather than more formal and extensive algorithmic processing (Gilovich et al., 2002, p. 15). Herbert Simon (1957) laid the foundation for research within this field by recognizing the inherent processing limitation of the human mind. Judgmental heuristics are principles or methods by which one makes assessments, judgments or solve problems. These heuristic are often very useful but sometimes they lead to systematic errors. Tversky & Kahneman (1974, p. 1124), focusing on cognitive biases that stem from the reliance on judgmental heuristics, found that *“people rely on a limited number of heuristic principles which reduce the complex tasks of assessing probabilities and predicting values to simpler judgmental operations. In general, these heuristics are quite useful, but sometimes they lead to severe and systematic errors”*. And, judgment heuristics were identified by the characteristic errors that they inevitably cause (Kahneman, 2002). Initially, Tversky & Kahneman (1974) identified three general-purpose heuristics of judgment, labeled representativeness, availability, and anchoring and adjustment, in conjunction with a dozen systematic biases, including non-regressive prediction, neglect of base-rate information, overconfidence and over-estimates of the frequency of events that are easy to recall (Kahneman, 2002). Gilovich et al. (2002) discern three important aspects of the heuristic and biases approach to the study of judgment under uncertainty; whereof the first is that heuristics themselves are rational estimation procedures, and second, heuristics draw on underlying highly sophisticated processes such as pattern-matching and memory retrieval.

The third aspect is that these heuristic processes are normal intuitive responses to even the simplest questions about probability, frequency, and prediction (Gilovich, 2002, p. 3). The role of representativeness in routine intuitive prediction that draws on automatic pattern-matching processes has been

subjected to various criticisms. This criticism refers mainly to the indirect type of design of the tests (the Linda and the engineer-lawyer problems) that Kahneman and Tversky (1982) uses as demonstrations of validity of the representativeness heuristic. Kahneman and Frederick (2002, p. 278) sum up this criticism by asserting that these scholars, of whom Gigerenzer (1991) took the most vigorous position, concluded that judgment biases are artificial and weak and that there is no need for judgment heuristics to explain them. As mentioned by Kahneman and Frederick (2002, p. 278), Kahneman and Tversky (1986) argued that the heuristics and biases position does not preclude the possibility of people's performing impeccably in particular designs of the Linda and the engineer-lawyer problems. And, the fact that people sometimes follow these principles is neither a surprise nor an argument against the role of representativeness in routine intuitive prediction.

The distinction between intuition and reasoning is a topic of enduring interest. Kahneman (2002, p. 451) asserts that there is considerable agreement on the characteristics that distinguish the two types of *cognitive processes*, which Stanovich and West (2000) labeled System 1 (*intuition*) and System 2 (*reasoning*). "The operations of System 1 are fast, automatic, effortless, associative, and difficult to control or modify, whereas the operations of System 2 are slower, serial, effortful, and deliberately controlled, but are also relatively flexible and potentially rule-governed (*ibid.*)"

In the view of Kahneman (2002) attribute substitution occurs when an individual has to make a judgment that is computationally complex, and instead substitutes a more easily calculated heuristic attribute. This substitution takes place in the intuitive judgment system, or System 1.

When someone tries to give an answer to a difficult question, he or she may actually answer a related but different question without being aware of that a substitution has taken place (*ibid.*). This may, according to Kahneman (2002), explain why a person may not be aware of biases even when the person is made aware of them. Kahneman and Frederick (2002) assert, which is important, that the study of conditions under which errors are avoided can help us understand the capabilities and limitations of reasoning, or System 2. Or, from a judgment point of view, by being aware of what biases are related to what heuristics, more informed judgments may be the result.

That judgments and intentions produced by System 1 can be modified or overridden by the deliberate operations of System 2 is a basic premise in Kahneman's reasoning. The position of System 1 and

System 2 in the brain might, according to Kahneman (2002), be the result of evolutionary history. The function of the brain from an evolutionary perspective is to provide coherent control over actions (Carew, 2000). Some cognitive functions of the brain tend to be lateralized in certain situations. However, as West et al. (2006) underline labels such as "logical" for the left hemisphere of the brain or "creative" for the right have to be treated by care inasmuch that while functions may be lateralized, these are only a tendency. Given the widespread lateralization of many vertebrate animals suggests that the evolutionary advantage of lateralization comes from the capacity to perform separate parallel tasks in each hemisphere of the brain (Halpern et al., 2005). An interesting question in this context is whether there are identifiable or measurable nexus between brain function lateralization and function of System 1 and System 2. A conceivable evolutionary advantage of distinguishing between intuition and reasoning when making judgment might be adroitness, which is crucial in a global environment. This presupposes, however, that resulting judgments are sufficiently accurate. An increased insight into this nexus might, for instance, be useful for management training and education.

The general framework offered by the heuristics and biases program (see for example, Kahneman and Tversky, 1973; Kahneman and Frederick, 2002) can be useful for principled search for analogies across domains, to identify common processes and to prevent overly narrow interpretations of findings (Kahneman, 2002, p. 483). What are urgently needed are new concepts and theories that are directly attributable to uncovered domains characterized by discretion and complexity.

In order to develop new concepts and theories a good starting point would be to observe how people make judgments in everyday life and in particular the fallibility of human reason. Gilovich (1991) claims that there are inherent biases in the data upon which people base their judgments, biases that must be recognized and overcome so as to arrive at sound judgments.

1.3. Fallibility of human reason in everyday life.

According to Gilovich (1991) there are inherent biases in the data upon which we base our beliefs, biases that must be recognized and overcome if we are to arrive at sound judgments and valid beliefs. And, the cost of these biases is tangible and real. When making judgments, people make use of number of informal rules and strategies that simplify difficult and/or uncertain problems and allow us to solve them without exaggerative effort. These informal rules and strategies are usually effective, but

occasionally they can lead to systematic errors. Hence, there is an ease/accuracy balance to be stricken in human judgment. Gilovich (1991) give several examples, for instances:

1. *Seeing order in randomness.* People are predisposed to see order or pattern in data, even when the data is totally random and irregular. This tendency to impose order or pattern is built into our cognitive ability that we use to apprehend the world. This natural tendency to misconstrue random events can be so automatic and unconstrained that we might come to believe in the existence of phenomena that do not exist. The intuition that random events such as coin flips should alternate more regularly between heads and tails than described by the laws of chance is called the “clustering illusion”. The clustering illusion may stem from a perception that the correct proportion of heads and tails should not only be present in a long sequence, but also locally in all of its parts.

The concept of statistical regression predicts that when any two variables are imperfectly correlated, extreme values of one of the variables are matched, on the averaged, by less extreme value of the other. However, without deeper understanding of statistical regression, people tend (1) to make non-regressive, or insufficient conservative, predictions, and (2) when failing to recognize statistical regression when it occurs, we tend to explain the observed phenomenon by construed causal theories. Because of this, we need to be careful when we draw conclusions based on order or pattern we think we see in some data.

2. *Tendency to seek confirmatory information.* We all have a natural tendency to look for evidence that will confirm our expectations and pre-existing beliefs, not evidence that contradict them. When testing a hypothesis of similarity, for example, people look for evidence of similarity rather dissimilarity, and when testing a hypothesis of dissimilarity, they do the opposite (ibid., p. 37).

3. *Hidden or absent data.* When we search for evidence, often there is information that we unintentionally overlook. This tendency is reinforced by the fact that there are many times when important information is hard to get hold of. Furthermore, it could be difficult to identify what data is absent and accurately characterize what that absent data is like. Hence, our search strategies may filter out important categories of data which results in that only a distorted side of an issue is presented.

4. *Reinterpreting evidence.* When people are presented with ambiguous information, they often interpret the ambiguous information to support their beliefs and preconceptions. And, when people are presented with unambiguous information that

contradicts their beliefs and preconceptions, they tend to examine the information in great detail, and either considered it too flawed to be relevant, or is redefined into a less damaging category.

5. *Remembering selective evidence.* According to commonsense psychology, people tend to remember their successes and forget their failures, and they are more apt to recall information that supports their beliefs and preconceptions than information that contradict them. However, Gilovich (1991) asserts “that people often resist the challenge of information that is inconsistent with their beliefs not by ignoring it, but by subjecting it to particularly intense scrutiny” (ibid., p. 62). The core issue is when people remember information that supports their beliefs better than information that contradicts them, and when the opposite holds. To explain the conflicting observations Gilovich introduces the distinction between “one-sided” and “two-sided” events. One-sided events are those events remembered as events only when they turn out one way, whereas two-sided events are those that stand out and remembered as events regardless of how they turn out.

People tend to remember events that cause them problem or difficulty, events that they predicted would happen, or events that otherwise drew their attention. At the same time, they tend to forget events that do not deviate from the normal.

1.4. How and how well do people judgments?

Judgment under uncertainty often rests on a limited number of simplifying heuristics rather than extensive algorithmic processing (Gilovich, Griffin and Kahneman, 2002). Kahneman and Frederick (2002) offered a definition of a generic heuristic process: A judgment is said to be mediated by a heuristic when the individual assesses a specified target attribute of a judgment object by substituting a related heuristic attribute that comes more readily to mind (Kahneman and Frederick, 2002, p. 53).

According to the classical model of rational choice, the “rational actor” (i.e., the typical person) chooses what options to pursue by assessing the probability of each possible outcome, identifying the utility to be derived from each, and combining these two estimates. The theory of rational choices assumes that people make the estimates and make them well. Many economic theories assume that people are rational and self-interested and are capable of making judgments toward their subjectively defined goals. Factually, however, people reason and make rational choices, but only within the limitations imposed by their limited search and computational capacities. Simon (1957) introduced the concept of bounded rationality to reflect the inherent processing limi-

tations of the human mind. Simon also discussed the simplifying heuristic that people could make use of to effectively get by given the inherent processing limitations.

Kahneman and Tversky (1974) developed their own view on bounded rationality, and came to the conclusion that processes of intuitive judgment were not just simpler than formal models demanded, but were different in kind.

Heuristics underlie many intuitive judgments under uncertainty (Kahneman and Tversky, 1974):

1. Heuristics are sensible estimation procedures.
2. Although heuristics yield approximate solutions, they draw on underlying processes (e.g., feature matching, memory retrieval) that are highly sophisticated.
3. Heuristic processes are not exceptional responses to problems of excessive complexity or an overload of information, but normal intuitive responses to even the simplest questions about, for example, likelihood, frequency, and prediction.

According to Kahneman and Tversky (1974, p. 1130), for judgments to be considered adequate, or rational, they must be compatible with the entire web of beliefs held by the individual. While Kahneman and Tversky use formal models as point of references Gigerenzer (2007) sets out trying to answer the question how intuition works and how ordinary people successfully use it in everyday life.

1.5. Expertise in making judgment and problem solving. Studies in how experts and novices differ in solving problems have to a large extent focused on mental representation of physics and mathematics problems (see for example Chi et al., 1981, 1982; Dreyfus and Dreyfus, 2005; Sweller et al., 1983). An oft-quoted source within this field of investigation, Chi et al. (1981, p. 125), found that experts' knowledge is represented at a deep level, while novices' knowledge is represented at a more concrete level. More specifically, the novices' use of surface features may involve either keywords given in the problem statement or abstracted visual configurations. In addition, the novices were also capable of going over and above the word level to classify by types of physical objects. On the other hand, it appears that the experts classify according to the major physics principle underpinning the solution of each problem (ibid., p. 125). Their findings also suggest that the experts' mental schemas contain more procedural knowledge which help in identifying applicable principle, while the novices' schemas contain typically declarative knowledge which do not facilitate the finding of proper methods for solution.

1.6. Accounting and auditing judgment. As accounting in the US moves toward the adoption of international accounting standards, which aims to be more principles than rules-based, the significance and frequency of judgments in decision-making and their financial statement consequences will increase (cf., SEC, 2008). According to Riahi-Belkaoui (2004), early studies in probabilistic judgments in the accounting literature made similar conclusions as Kahneman and Tversky concerning the use of simplifying heuristics, but with the additional insight that the use of heuristics may be sensitive to task and situation variables. Riahi-Belkaoui (2004) observes that research on the departures from normative decision-making behavior has seized on heuristics and biases – essentially, representativeness in auditing, anchoring in auditing, anchoring in management control, and anchoring in financial analysis (ibid., p. 375). After reviewing the behavioral auditing literature Shanteau (1989) finds that accounting researchers frequently have difficulty in translating the findings of Kahneman and Tversky into an auditing framework.

Another observation is that the reported results of many studies are often close to normative, and even when the reported findings complies with heuristics and biases, the effects are smaller than those reported by Kahneman and Tversky. A third observation is that there seems to be a tendency within this bulk of literature to define success or failure of a study by whether biases are observed or not. A final observation is there has been a tendency in auditing studies of heuristics and biases to cite framing effects to account for the generally inclusive results.

1.7. Distinguishing features of accounting and auditing tasks. According to Ashton and Ashton (1999) at the most fundamental level, the judgment tasks and settings of accounting and auditing resemble those of any domain; whereas numbers of features tend to distinguishing accounting and auditing tasks from those in generic settings.

Four such features relate to (Ashton and Ashton, 1999): (1) the multiperiod, multiperson nature of judgments; (2) enormous financial (and other) consequences involved; (3) the presence of markets, and (4) important institutional considerations.

1. Many judgments in accounting and auditing are made in *multiperiod and/or multiperson* settings. Judgments typically have repetitive consequences over a number of time periods, often needs to be repeated and often must take into account the views of others.

Multiperiod and/or multiperson settings nature of accounting and auditing tasks tend to place great

demand for clarification of the basis for consideration underlying judgments. The multiperiod nature emphasizes an approach to judgment that is sequential and iterative, while the multiperson nature notably increases the accountability requirements of the judgment.

2. Tasks and settings of accounting and auditing tend to have *financial consequences* that often are significant.

Furthermore, accounting and auditing judgment tasks are not restricted to financial outcomes, but involve human consequences as well. For example, if an auditor wrongly certifies that an entity's financial statements are "free of material misstatements" when they subsequently are found not to be free of material misstatements could result in criminal or civil liability claims.

3. As the contents of financial reporting tend to have an effect on how the market interprets the performance and financial position of an entity the accounting and auditing judgment settings are *affected by various markets*.

The behavior of the markets is adding as significant layer of complexity to the accounting and auditing judgment task.

4. Accounting and auditing judgment tasks are to be related to *institutional professional settings*.

The accounting and auditing profession, networks of regulatory agencies and enforcement bodies have to be taken into account those making accounting and auditing judgments.

For example, the decision of the individual auditors are made in settings that involve (1) the presence of other members of the audit team, including peers, subordinates, and superiors; (2) the existence of a market for audit services in which other independent auditing firms compete for audit clients; (3) a strong professional society that formulates professional standards and enforces a code of professional responsibilities; (4) a regulatory environment involving massive government agencies, and (5) a legal environment involving increasingly frequent lawsuits against auditors alleging fraud or negligence in the performance of the audit, which can result in large financial losses for which insurance is becoming increasingly difficult to obtain. Such a setting imposes enormous constraints and risks that influence judgments made throughout an audit. Ashton and Ashton (1999) conclude that in many applied fields, perhaps the key distinguishing feature is the professional nature of both the judgments and the judgment settings.

2. Empirical observations

2.1. Initial accounting for internally generated intangible assets in the consumer goods and services sector. One case in point concerning the formal logical understanding of judgment heuristics in a well-structured domain, Eriksson and Mehanovic (2012) study initial accounting for internally generated intangible assets in the consumer goods and services sector. The authors reiterate that the principles-based alignment of IASB-standards allows per se for discretion. Intangible assets are non-monetary assets which are without physical substance and identifiable (either being separable or arising from contractual or other legal rights). Special recognition criteria are set for internally generated intangible assets. All assets are referring to future earnings. The non-monetary and non-physical nature of intangible assets implies complexity, and, when these assets are internally generated, their non-objective nature will increase even more to complexity. Hence, initial accounting for internally created intangible assets leaves room for additional discretion, or judgment under uncertainty.

Eriksson and Mehanovic (2012) discuss three general-purpose heuristics representativeness, availability, and anchoring and adjustment, and their underlying mechanisms such as pattern-matching processes and memory retrieval processes. The representativeness heuristic answers the question which degree A represents B, or the degree to which A resembles B. Regarding intangible asset the question is whether a development expenditure (A) represents, or resembles, an asset (B). The two systematic biases related to representativeness heuristic not considering previously known probabilities and no account is taken to predictability. The availability heuristic refers to the situation when someone makes a judgment of (a) frequency or (b) probability by recalling from memory a related occasion, an event or an example. Concerning intangible asset one of the more difficult recognition criteria to meet is its probable future earning capacity. The aspects regarding availability are frequency and probability of internal generated intangible assets. Use of the availability heuristic may leads to error whenever memory retrieval is biased owing to actual frequency or probability because a person's tendency to seek out and remember dramatic cases or because a tendency to call attention to examples of particular (restricted) type (Gilovich et al., 2002, p. 3). Hence, conceivable biases regarding the availability heuristic are biases due to recycling of examples and biases owing to the efficiency of the search function.

Eriksson and Mehanovic (2012) did not consider the anchoring and adjustment heuristic relevant to their

study, that is, a heuristic that influences the way people intuitively assess probabilities. People start with an implicitly suggested reference point (the “anchor”) and make adjustments to it to reach their estimate by making incremental adjustments based on additional information. A referable bias is a tendency to rely too heavily, or “anchor”, on a past reference or on one trait or piece of information when making judgments.

The authors set out to getting an insight into how companies do make use of rules of thumb in connection with initial accounting for internally generated intangible assets. Whether to cost or activate development expenditure include a probability calculus and pattern-matching, which, in turn, requires handling of two related biases: (a) not considering previously known probabilities, and (b) no account is taken to predictability.

In order to avoiding bias (a), companies have to consider the success rate of previous development projects when estimating a current project’s probability to earn future returns.

According to Kahneman and Tversky (1982) bias (b) implies that humans ignore the rule of insufficient reason if information is presented favorably (framing). Eriksson and Mehanovic (2012) emphasize that to eschew bias (b) people involved in particular judgments can partake in open discussions regarding the presented information. For example, by scrutinizing and questioning the information framing effects could be uncovered.

The authors observe that companies that make use of the availability heuristic utilize informal rules of thumb. Memories, events, and examples are different expressions of experience that are transformed into informal rules of thumb. Biases attributable to the availability heuristic are (c) recycling of examples and (d) efficiency of the search function. A specific or salient example that is easily retraced in memory is given too much weight comparing the company’s collective memory within a particular field of interest. One recurring example is the difficulty to distinguish between development and maintenance within the field of IT. That previously was considered development is now maintenance due to the rapid development of IT. In order to dodge bias (c) you have to consider that your experience quickly become obsolete. As to (d) the efficiency of the search function, the more interpretations and judgments made the more refined search function. Hence, biases (c) and (d) may be alleviated by experiential learning (Kolb, 1984).

2.2. What are the motives of using heuristics or rules of thumb? Wyatt (2005) identified four

economic determinants of recognized intangible assets; key individuals, experiences, size of company, size of internally generated intangible assets. Eriksson and Mehanovic (2012) set out from the empirical observations and discuss companies’ use of rules of thumb from the identified determinants. The authors conclude that key individuals have the upper hand regarding actual application of rules of thumb, whether they are given a formal or informal presence, or non. Regarding IT, the use of rules of thumb seems to be associated with knowing how to account for internally generated intangible assets, the distinction between capitalizing and costing, IFRS accounting standards, and the company’s development cycle. The authors consider that in order to appropriate the gains of a fast technological cycle, large companies tend to build up formal rules of thumb. This indicates that the size of the company has implication to what extend rules of thumb will be applicable.

The fourth economic determinant which is postulated to have an effect on the use of rules of thumb is the size of internally generated intangible assets. The stated rationale for this determinant is the higher frequencies of internally generated intangible assets, which result in larger items on the balance sheet, the more experience the company will accumulate. Also, large items on the balance sheet are linked to relevance, and hence the accuracy to which the items are exposed to. Formal rules of thumb seem to be convenient mechanisms for dealing with the related complexity.

3. Analysis and discussion

3.1. Intangible assets and innovation. Generally, intangible assets only generate cash flows in combination with complementary assets (RedU 7). Tangible fixed assets, working capital, technology, the workforce, brands and established customer relationships are examples of contributory assets (ibid.). Complementary assets in the view of IFRS 3 (2008) are more or less related to marketing-related intangible assets such as trademarks, trade names, service marks, collective marks and certification marks. IFRS 3 (2008) further explicates that brand and brand name typically refer to a group of complementary assets, such as a trademark (or service mark) and its related trade name, formulae, recipes and technological expertise.

IFRS 3 (2008) emphasizes that the standard does not preclude an entity from recognizing, as a single asset separate from goodwill, a group of complementary intangible assets commonly referred to as a brand if the assets that make up that group have similar useful lives. Teece (1987), who was the first to define the concept of complementary assets,

has a more comprehensive, inclusive definition. He differentiates between complementary assets that are generic, specialized and cospecialized. Generic assets are general purpose assets that do not need to be tailored to the innovation in question. Specialized assets are those where there is unilateral dependence between the innovation and the complementary asset. Cospecialized assets are those for which there is a bilateral dependence (*ibid.*, p. 289). In most cases, successful commercialization or use of an innovation can only be accomplished in conjunction with other generic, specialized or cospecialized assets and capabilities.

In addition, intangible assets are distinctly linked either to a business model or business process more generally, or to an innovation process more specifically. An innovation consists of certain knowledge (often technical knowledge) of how to do things better than the existing solution or design (Teece, 1987, 2000). If the know-how in question can be codified, then the know-how meets the contractual-legal criterion as well as the separability criterion and can be recognized as separate from goodwill (IAS 38.12). Usually intangibles are so specific that there is no active market for them or comparable transactions (IAS 38). In a business combination, the identification of intangible assets not previously recognized requires a vigilant and thorough analysis of the acquired company's business model, value drivers, business plans, and business legal environment (RedU 7.16). Upton (2001, pp. 69-70) identifies important differences among internally generated intangible resources in that some, such as R&D and software, are created in quite a similar way as tangible assets, while others, such as customer lists, brand names, and databases, often come from the operating activities of a reporting entity. Still others, for example, the value of insurance-in-force, exist only due to their relation to some other asset or liability. It is, according to Upton (2001), mainly items in the second and third groups that present substantial challenges in identification, recognition, and measurement. Development projects are intangible in nature; any value assignable to them is based on the underlying know-how rather than physical items such as prototypes (Alexander et al., 2009, p. 296).

An intangible economic resource arising from development or from an internal project should be recognized if, and only if, the reporting entity can demonstrate six criteria, one of which is the technical feasibility of completing the intangible asset so that it will be available for use or sale (IAS 38.57). The significance of the technical feasibility criterion is underlined by the findings of, for example, Wyatt

(2005, p. 967), which indicate that the entity's choice to record intangible assets is associated with the strength of the technology, the time-to-market, and property-rights-related factors that affect the entity's ability to capture future economic benefits. Furthermore, the results reported by Dedman et al. (2009) suggest that R&D activities are not systematically misunderstood by the market.

The concept of innovation might serve as a basis for the identification, recognition, and measurement of intangible assets by imparting conceptual relevance to the recognition criteria stated in IAS 38.57. The term innovation comes from the Latin, *innovare*, meaning "to make something new." Different observers tend to rely on different definitions of innovation. Tidd et al. (2005) offer a definition that captures the essence of the term, positing that "innovation is a process of turning opportunity into new ideas and putting these into widely used practice" (p. 66). IAS 38.57 identifies when the innovation or development process will turn a new idea into a new product with a future of wide use in practice. According to IAS 38, development costs after the technical and commercial feasibility of the new product for sale or use have been established and before the product is available for general release are capitalized. Hence, IAS 38.57 defines when an innovation becomes an innovation.

By relating IAS 38.57 criteria to a robust model of an enterprise's innovation process, perceived from a senior management perspective, the reliability of the recognized information may be enhanced, and/or may affect the timing of recognition.

What distinguishes intangible assets is that they are unique, at least in some sense, and must be assessed individually. This makes accounting of intangibles an interesting issue from a judgmental perspective. Moreover, the value of intangible assets arises in a specific context, which means that in some situations it may be difficult to distinguish one intangible asset from another tangible or intangible asset.

Assets can be perceived as a repository of future economic benefits. As the future is uncertain by definition, accounting for intangible assets includes an element of uncertainty. Hence, accounting for intangible assets requires a certain amount of judgment under uncertainty. Generally, intangible assets can be acquired in a business combination, separately acquired, or internally generated (see IAS 38). Accounting for intangibles in a business combination – and for internally generated intangible assets in particular – requires a great deal of judgment in uncertain circumstances. This has been taken into account by the IASB.

The Accounting Standards Board of Japan (ASBJ, 2008) conducted a survey of accounting treatment of internally generated development costs of fifty large corporations covering a period of three years and concludes that “if an accounting standard similar to IAS 38 would be introduced in Japan, it would be necessary to incorporate more specific guidelines with regard to how management should make estimates and judgments” (ibid., p. 4). The ASBJ’s conclusion indicates the need to complement IAS 38 with additional guidelines or heuristics.

People, according to Tversky and Kahneman (1974), tend to rely on a limited number of heuristic principles when dealing with complex and/or uncertain tasks. In most cases, these heuristics are quite useful, but sometimes they lead to systematic errors. Frequently, heuristics are associated with how experienced individuals or experts solve problems or make judgments. In terms of contrasting experts with novices, a translation of the findings of Chi et al. (1981) into the field of accounting would suggest that an experienced accountant may use heuristics to identify what model, or more generally, what accounting principle is applicable to what accounting problem based on experience. Initially, this identification or pattern-matching process takes place in the intuitive judgment system, or System 1, which is characterized by being fast, parallel, automatic, effortless, associative and slow-learning. The experienced accountants’ mental schemata contain procedural knowledge that helps in identifying and making use of applicable models. Hence, the deliberate operations of System 2, or reasoning, take the upper hand, checking and putting the model to effective use. The process of System 2 is characterized as being slow, serial, controlled, effortful, rule-governed, and flexible. Eriksson and Mehanovic (2012) conclude that in order to appropriate the gains of a fast technological cycle, large companies tend to build up formal heuristics. This indicates that the size of the company has implications for the extent to which heuristics will be applicable.

3.2. Can accounting judgments regarding internally generated intangible items be improved as a result of accountants gaining increased knowledge of and insight into heuristics and biases? The value of intangible assets, which holds for all assets, is directly related to future benefits; the problem of assessing the value of assets is that we can only make educated guesses about the future. Thus it is imperative for the preparer of financial reports to provide all relevant information concerning material accounting items and events so that the reports meet the common needs of most users, including the need to

assess the accounting judgments made concerning identifying, measuring and recognizing internally generated intangible assets.

Given the importance of intangible assets, including internally generated assets, as a value driver for economic growth, there is good reason to assume that information disclosed in the notes about what accounting judgments are made concerning internally generated intangible assets, and on what grounds, is relevant information. These grounds can include assumptions made, which heuristics of judgment are applied, and which biases are avoided. In addition to meeting the needs of users, by providing this accountability information, the preparers will also develop their skills in making accounting judgments regarding internally generated intangible assets.

Given this analysis, the following hypothesis can be formulated:

Hypothesis: Accounting judgments regarding internally generated intangible items are significantly improved when accountants gain increased knowledge of and insights into heuristics and biases.

Also, from a regulatory point of view, standard-setters will be able to collect and analyze information that reveals not just accounting practice, but the thinking and reasoning of preparers regarding internally generated intangible assets.

Conclusion

As the global economy becomes more complex and dynamic, it becomes increasingly difficult to craft standardized accounting rules that fit the entire range of reporting entities. Principles-based accounting allows the individual reporting entity to prepare its financial statements as it sees best to provide information that is useful to existing and potential investors, lenders and other creditors in making decisions about providing resources to the entity. In this accounting context, accounting judgments are becoming increasingly important and frequent. Identifying and recognizing internally generated intangible assets is a typical case of judgment under uncertainty. Judgment under uncertainty often rests on a limited number of simplifying heuristics rather than extensive logical reasoning (c.f., Gilovich, Griffin and Kahneman, 2002; Kahneman and Frederick, 2002).

According to Ashton and Ashton (1999), accounting judgment tasks are to be related to institutional professional settings, which include generally accepted accounting principles, a highly structured system. Although heuristics yield “rough and ready” solutions, they draw on underlying processes that are highly sophisticated (Kahneman and Tversky,

1974). And, for an accounting judgment to be considered adequate, or rational, it has to be compatible with all the beliefs held by the individual accountant. From an accounting point of view, it is vital that judgments and intentions produced by System 1 can be modified or overridden by the deliberate operations of System 2, that is, that a direct interrelationship exists between intuition and reasoning. This indicates that heuristics are experience-based, which makes it interesting to study accounting judgments from a heuristics and biases perspective.

By studying the underlying processes on which accounting judgments are founded we can learn more about how accountants reason in relation to various accounting standards given different economic situations. The focus is on how accountants go about tackling complex accounting problems. Hence, this paper takes a different view on heuristics and biases related to accounting judgments than do previous research in that the main focus is set on the use and design of heuristics and biases and to a lesser extent on departures from normative decision-making behavior.

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