AUDITORS' PERFORMANCE IN RISK AND CONTROL JUDGMENTS

An Empirical Study

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Preface

Many of my family, friends and acquaintances somehow share the view that a Ph.D. project is a long, never-ending story. Another association these people have with researchers is that researchers stem from another planet and live isolated from all other human beings. Both these views are also part of my personal experience, although I would rather suggest a far more positive association with research and researchers. One of the most exciting opportunities has been, for example, my attendance of the triple AAA Conference on Auditing Research in New Orleans. Approximately half a year later, this city and region were destroyed by the hurricane Katrina. Unfortunately, joy and sorrow often are close to each other. I have experienced my research project as an enjoyable journey, discovering lots of new things and producing new things. However, this has not been merely the result of my own efforts. Many people have functioned as a "Lonely Planet" guide during all stages of the project. I would like to express my thanks to everybody who has helped me in this regard.

First of all, many thanks go to the supervisors of this thesis. With the 'risk' of under-accentuating other favorable features of them, I have very much appreciated the methodological and theoretical insights of Tom Groot, the practical and managerial insights of Caren van Egten, as well as the overview on auditing practice of Roger Dassen. Ernst & Young, under supervision of Hans Verkruijsse, has provided me with both financial and content support. In particular I owe many thanks to Luc Quadackers, not only for being a colleague within both ARCA and Ernst & Young, but also for his energy spent on my project, his insights and overview of auditing research literature and auditing theory, and last but not least for being a warm friend.

I have also appreciated the peaceful atmosphere at the accounting department of the Vrije Universiteit, both in terms of the absence of uncomfortable telephone calls as well as the presence of stimulating colleagues, who never hesitated to spend time on many statistical issues. In particular I would like to mention the efforts of Eelke Wiersma, Martijn Schoute, Henri Dekker, and Tjerk Budding.

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Budding (Vrije Universiteit), Hanne Veldman (BDO CampsObers/Vrije Universiteit) and Hans Bijvoet (Ernst & Young). A special contribution to my thesis came from the 'Business Leaders' of the Big4 audit firms in the construction industry, who participated in the expert panel: Erik Roelofs (Deloitte), Jack van Rooijen (KPMG), Wim Kerst (Ernst & Young), and Hans ter Borgh (PriceWaterhouseCoopers).

At this place, I also want to express my sincere thanks to my parents, and other family members and friends, who have showed interest in my research, and to whom I often had to say sorry for being absent at social events. In that regard, the 'communis opinio' on researchers (namely, that they live in isolation) has been true to a certain extent.

Without the help, support and love of my wife Marga, and my sons Roger and Marc, this thesis would never have been finalized. They must have suffered a lot from it and I am really very thankful for their understanding.

Last but certainly not least, my Creator gave me the talents and opportunities to work on and finalize this thesis. His name shall be glorified forever!

"And by knowledge shall the chambers be filled with all precious and pleasant riches. A wise man is strong; yea, a man of knowledge increaseth strength" (Proverbs 24: 4 and 5)

"And further, by these, my son, be admonished: of making many books there is no end; and much study is a weariness of the flesh" (Ecclesiastes 12:12)

1 Introduction

During the 1990s, the major audit firms reengineered their audit approach. This new audit approach has been referred to as the 'Strategic Systems Audit' (e.g., Bell *et al*., 1997) or the Business Risk Audit (Eilifsen *et al.*, 2001). Before these new audit approaches were introduced the audit approach evolved from a primary substantive testing-based audit approach to a *primary systems-based audit*. Under the systems-based audit approach, the auditor tests the internal controls which have been designed and put into operation by the audit client. A basic assumption under this approach is that the client's internal control system improves the reliability of the general ledger resulting in improved fairness of the financial statements. The purpose of the systems-based audit approach – as compared to the primarily substantive testing based approach – is to rely on the company's internal controls and to reduce the amount of substantive testing. From the 1970s onwards, the systems-based audit approach incorporated the audit risk model. The audit risk model is often presented as follows:

AR = inherent risk * control risk * detection risk.

Where:

- Inherent risk is defined as the susceptibility of an assertion to misstatement that could be material, either individually or when aggregated with other misstatements, assuming that there are no related controls (ISA200, IFAC, 2003).
- Control risk is defined as the risk that a misstatement could occur in an assertion and that could be material, either individually or when aggregated with other misstatements, will not be prevented, or detected and corrected, on a timely basis by the entity's internal control (ISA200, IFAC, 2003). And
- Detection risk is defined as the risk that material misstatements are not detected by the auditors' audit procedures (ISA200, IFAC, 2003).

Although the audit risk model has been criticized since its introduction (e.g., the multiplicative formula of the model suggests that the components are dependent of each other where it has been argued that the components are independent of each other), the model is still widely used in audit practice (e.g., IFAC, 2003). The Business Risk Audit did not abolish the audit risk model, but added a new concept to the methodology, namely 'client's business risk'. Client business risk is defined as "the risk that the audited entity will fail to achieve its objectives" (Lemon *et al.,* 2000, p.1). From this definition of client's business risk no direct reference is made to the audited entity's financial statements. For example Bell *et al.* (Bell *et al.,* 1997; Knechel, 2001) argued that many

clients' business risks in the end may result in a material financial statement misstatement. In addition, integrating the manner by which the company manages its own business may result in higher-level internal controls that may reduce audit risk (e.g., Van Buuren, 2006).

Audit firms have argued that the introduction of this new approach would also result in improved audit quality (see Erickson *et al*., 2000). Audit quality has increased significantly in importance in the past ten years, because of – amongst other reasons – business failures and audit failures. The fall of Enron and later on the fall of the audit firm Arthur Andersen may serve as an example. In Chapter 2 the historical developments which gave rise to a reengineered audit approach and other modifications to this approach (in addition to adding the concept of 'client business risk') will be further described.

Both the introduction of a new audit approach and the enlarged focus on audit quality were reasons for a new study of the quality of the auditor's judgment performance. This area is currently scarcely explored. Prior studies of the auditor's judgment performance mainly started in the 1980s. These studies have increasingly made use of concepts and methodologies from cognitive psychology, e.g., concepts such as consensus as a measure of the quality of judgment performance and methodologies such as the policy-capturing models stemming from the psychology field of science. One of the elements of prior research that has extensively been investigated is the relationship between the length of the auditor's tenure with an audit firm and the quality of judgment performance (see for example Wright, 1988). Some of these studies do not show that the auditor's judgment performance increases with an increase in experience (e.g., Verkruijsse, 2005). However, other studies provide evidence that auditors for example seem to be open to client persuasion in early years of the client-auditor relationship. It is suggested that this phenomenon may be due to "recouping the start-up costs" of the audit firm (see for example, Venkataraman and Rama, 2004). So, mixed evidence has been reported in this regard.

The main research question of this thesis is whether and to what extent, the auditor's judgment performance in conducting some tasks of the Business Risk Audit is associated with the auditor's experience. Experience will be used as independent variable in this empirical study and will be distinguished into three categories of experience: general experience (as measured by the number of years the auditor has experience in the auditing field), industry experience (as measured by the number of hours spent on the audit of industry-specific audit engagements over the past three

years), and task-specific experience (as measured by the number of times the specific audit tasks investigated in this thesis have been performed as well as the number of hours spent on these tasks). The auditor's judgment performance has a relationship with organizational controls within the audit firm (Van Kuijck, 1999). To what extent these controls are of importance related to the Business Risk Audit has been largely unexplored until now. Of these controls, one specific control (the perceived level of feedback) is added as the fourth independent variable in this thesis. The fifth independent variable examined in this thesis is 'level of risk-aversion'. This variable measures the (general) level of risk-aversion in a gamble game. It will be investigated whether this type of general risk-aversion influences the auditor's judgment performance in an audit risk assessment task.

In sum, the research questions are as follows:

1 Is the auditor's judgment performance associated with the auditor's level of general experience, and if so to what extent?
2 Is the auditor's judgment performance associated with the auditor's level of industry experience, and if so to what extent?
3 Is the auditor's judgment performance associated with the auditor's level of task-specific experience, and if so to what extent?
4 Is the auditor's judgment performance associated with the auditor's perceived level of feedback when performing a Business Risk Audit task, and if so to what extent?

This thesis aims to contribute to the audit profession in the sense that the auditor's judgment performance relating to the Business Risk Audit is largely unexplored. Delivering high quality audits is of significant importance to audit firms, specifically in the current (litigious) audit environment. This thesis also contributes to audit research literature for the same reason. In addition, this thesis incorporates the simultaneous examination of various measures of judgment performance (both in terms of accuracy and consensus) and various measures of the auditor's experience (general experience, task-specific experience, and industry experience).

This thesis is organized as follows. In Chapter 2, firstly the historical development and content of the Business Risk Audit will be described. Secondly, prior research studies will be reviewed related to the research questions as set out above. Based on these prior research studies, research hypotheses will be developed. Chapter 3 provides an exposé on the various elements of the research design and hence provides the context and setting in which the research questions have been embedded. The results of the empirical study will be described in the Chapters 4 and 5. Chapter 4 is focused on the

empirical results related to the task ‘Identification of client’s business risks and entity-level controls’ while Chapter 5 is focused on the empirical results related to the task ‘Assessing the impact of client’s business risks and entity-level controls on audit risk’. This thesis concludes in Chapter 6 with a summary the findings and addresses the implication of these findings from both a theoretical and practical perspective.

2 Previous literature overview and research hypotheses

2.1 Introduction

Chapter 2 provides an overview of existing audit research literature relating to the research questions as described in the previous chapter. These research questions focus on the auditor's judgment performance with respect to the business risk audit approach. Regarding the business risk audit approach the focus of this empirical study is on the tasks 'identification of client's business risks and client's entity-level controls' as well as on the task 'assessing the impact of client's business risks and client's entity-level controls on audit risk'. Chapter 2 discusses how this empirical study contributes both to existing research literature on auditing as well as to the current auditing practice. Additionally, in considering previously conducted research studies the arguments underlying the research hypotheses of this empirical study are developed.

Chapter 2 is structured as follows. In section 2.2 an overview is provided of the main themes of the business risk audit approach and the development of industry-specialization within audit firms. This will be helpful in selecting specific audit procedures for the research design. Section 2.3 describes the auditors' judgment process when performing the procedures investigated in this empirical study. In sections 2.4 and 2.5 existing literature concerning the auditors' judgment performance on these audit procedures will be discussed.

2.2 Developments in audit methodologies and audit firm's industry-specialization

2.2.1 Developments in audit methodologies

Financial statement audits comprise the process of evaluating the quality of assertions (e.g., completeness or accuracy) versus specific criteria which in the end result in the auditors' opinion on the reliability of the financial statements (Solomon and Shields, 1995, p. 138). Individual auditors perform audit procedures which are derived from or based on the audit methodology as developed by the audit firm where they are

employed. Audit methodologies should follow the latest available rules and regulations as provided by both national (e.g., NIvRA in the Netherlands) and international institutions (e.g., IFAC). However, audit methodologies are also influenced by other developments like expectations from the audit market, firm-specific interpretations of auditing standards, et cetera (Lemon *et al.,* 2000). Although audit methodologies are likely to change over time, in the 1990s audit firms changed their audit methodology *significantly* (Bell *et al.*, 1997; Choy and King, 2003). The following reasons for changing the existing audit methodology into the business risk audit methodology can be mentioned (see also Lemon *et al.,* 2000):

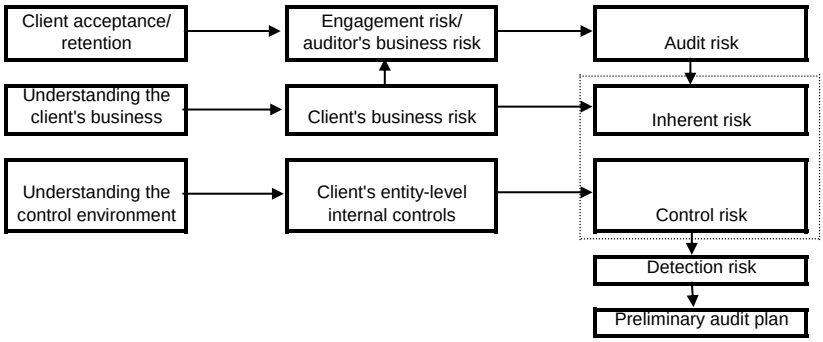
- Improving the *effectiveness* of the financial statement audit (Erickson *et al.*, 2000). The previous audit methodology ("systems-based audit approach") did in some cases not detect material misstatements (a.o., detection of going concern problems) resulting from the business context (e.g., changing business environments, globalization and technological changes). These authors argue that industry knowledge would have provided better input into the analytical procedures which would have resulted in a signal that the financial statements contained an error[1]. This argument which has recently found some support in the study of Blokdijk *et al.* (working paper, 2004) related to the Dutch audit market place.
- Improving the *efficiency* of the financial statement audit. By placing more emphasis on the planning stage of the audit, audit firms suggested that this would result in opportunities for reductions in substantive testing (Lemon *et al.,* 2000) although Kotchetova stated that "the Report of the Panel on Audit Effectiveness emphasized the lack of guidance regarding UCB ('Understanding the client's business') processes and risks, and linking the nature, timing, and extent of substantive tests to risk assessments (Kotchetova, 2002, p.4; POB, 2000, p.19/37)." The previously mentioned study of Blokdijk *et al.* (2004) did not find support for this argument in The Netherlands, at least not for Big5 audit firms.
- *Marketing arguments*. The auditor's focus in the financial statement audit is to assess the fairness of the financial statements. As a result of this, the auditor is likely to find areas where the audit client's system of internal controls can be improved. Since the start of the accounting profession, the auditor has a 'natural' advisory function to client management in providing recommendations for improvement of the client's control system. The business risk audit approach places the auditor even more in the position of sparring with client management about the client's business, which probably results in client management requesting additional (assurance) services from the audit firm.

[1] This is what Solomon *et al.* (1999) call 'error'-knowledge as distinguished from 'non-error' knowledge (i.e., knowledge that is helpful in, e.g., understanding the client's business which is not related to errors).

- *Changes in technology* is suggested to result in data records that are inherently less exposed to routine errors and, thus, modern information systems are deemed to be more reliable (Bell *et al.*, 1997).
- *Other arguments*. Other arguments favorable to the business risk audit approach are the increased emphasis of regulators regarding *corporate governance* (which is an argument for a more holistic audit approach), *internationalization* (internationally consistent audit approaches), *product differentiation* amongst audit firms (since the financial statement audit is deemed to be a commodity product, audit firms search for opportunities to differentiate themselves from other firms), and *better understanding of the auditors' business risk* (engagement risk). Auditors' business risk is the risk that "the audit firm will suffer a loss resulting from the engagement, via litigation, loss of reputation, or engagement costs exceeding engagement fees (Bell, 2001, p. 97; AICPA 1983, AU 312.02)." For example, by understanding that the audit client operates in an environment that involves high business risks, the auditor evaluates whether and to what extent this potentially impacts the auditors' reputation assuming for example audit failures. In this thesis, the focus is on client's business risk, not on auditors' business risk. As a result, the concept of auditors' business risk will be ignored in the remainder of this thesis.

In auditing literature the audit firm methodologies were since then named 'business risk' audit methodology as distinguished from the (primarily) substantive, systems-based and audit risk audit methodology. The business risk audit methodology relies "much more explicitly than previously on concepts of business analysis and the identification of business risk, defined as the risk that the audited entity will fail to achieve its objectives, as a means for structuring the audit process" (Lemon *et al*., 2000, p.1). Admitted, earlier textbooks on auditing (e.g., Frielink and De Heer, 1999 and earlier editions) stressed the importance of 'understanding the client's business', but theoretical concepts like Porter's (1998) theory of the competitive forces, were not prescribed or recommended to be used as standardized tools. Audit firms that already implemented the business risk audit approach anticipated international auditing standards. Not earlier than the year 2003 the international auditing standards incorporated the concept of 'business risk' (e.g. ISA 315, 330, IFAC, 2003). Lemon *et al.* (2000, p. 23) argue that regulators may have been reluctant to accept the business risk approach since they perceived the business risk audit approach to be less effective compared to the conventional audit risk model. However, the implementation of a business risk audit approach does not exclude the use of this risk model but rather extends the audit risk model as the auditor will also assess the impact of identified business risks on assertion-specific audit risks. This is visualized in Figure 2.1.

Figure 2.1 Relationship between business risk audit and audit risk model (adapted from Kotchetova, 2002, p.83)



The audit risk model has – despite its criticisms – been used as a generally accepted judgment model in the financial statement audit (see also IFAC, 2003). Auditors generally do not apply this model as a calculation model (although audit risk has initially been presented as a multiplicative formula of inherent risk, control risk, and detection risk), but instead have shown that they use the audit risk model as a structured means of considering those areas where risks of material errors are likely to occur and to design specific audit procedures to detect those (if any) material errors (e.g., Messier and Austen, 2000). In addition, Dilla and Stone (1997) reported that auditors are most likely to express the audit risk judgments in terms of words and not in terms of numbers (Dilla and Stone, 1997, p.712).

The audit process of gathering evidence on the quality of the management assertions in the financial statements consists of several phases and each phase consists of several tasks or audit procedures. The following phases can be distinguished during the course of an audit engagement (Arens *et al.*, 2005; Hayes *et al*., 2004):

1 Plan and design an audit approach;
2 Perform tests of controls and substantive tests of transactions;
3 Perform analytical procedures and tests of details of balances;
4 Complete the audit and issue an audit report.

Part of the planning stage is to develop an understanding of the client's business. ISA 315 (IFAC, 2003, section 6, p.4) states in this regard: "obtaining an understanding of the entity and its environment, including its internal control, is a continuous, dynamic process of gathering, updating and analyzing information throughout the audit". This information may be used by the auditor as audit evidence to support assessments of the risk of material misstatements (in Figure 2.1 described as audit risk). The auditor engages in several cognitive processes in the planning phase of the financial statement audit, e.g. searching for information regarding the client environment both from sources like memory as well as outside sources (Bonner and Pennington, 1991). For planning tasks, knowledge is required with respect to understanding the client's business, which comprises factors like economic and industry forces to which the audit client is exposed, as well as company-specific factors, e.g. the company's strategy and objectives, business processes, personnel, and financial information systems, etc. The auditor should perform the following audit procedures when gaining an understanding of the client's business (ISA315, IFAC, 2003, p.5):

- Inquiries of management and others within the entity;
- Analytical procedures;
- Observation and inspection procedures.

Although these audit procedures basically do not differ from more traditional audit approaches, Lemon *et al.* (2000, p.21) argue that the *evidence gathering process* in the business risk audit approach is different. In the first place, more and other types of judgment are necessary in order to get an understanding of the client's business. E.g., the auditor is required under the business risk audit approach to identify at least those client's business risks (both strategic and operational risks) that can impact the fairness of the financial statements. Additionally, the auditor needs to identify those internal controls (both on an entity-level and a transactional level) that are designed to mitigate business risks and audit risks[2]. These judgments necessarily need to result in a decision on the impact of the identified client's business risks and internal controls on the remaining audit procedures (audit work-program). In the second place, and as a result of

[2] See for example ISA 315, section 32 (IFAC, 2003): "Most business risk will eventually have financial consequences, and, therefore, an effect on the financial statements. However, not all business risks give rise to risks of material misstatement. A business risk may have an immediate consequence for the risk of misstatement for classes of transactions, account balances, and disclosures at the assertion level or the financial statements as a whole. For example, the business risk arising from a contracting customer base due to industry consolidation may increase the risk of misstatement associated with the valuation of receivables. However, the same risk, particularly in combination with a contracting economy, may also have a longer-term consequence, which the auditor considers when assessing the appropriateness of the going concern assumption."

the complex judgments[3] to be made, it is expected that more senior levels within the audit firm are involved in the evidence gathering process. Since there is more focus on the planning phase and inquiries with client management, and given the complexity of the client's environment (including higher-level internal controls), the audit mix will necessarily change to more audit manager and audit partner involvement at an early stage of the financial statement audit. Thirdly, the evidence gathering process has changed in recent years because of increased documentation requirements, e.g. PCAOB 3 (PCAOB, 2004). Based on audit documentation standards, the auditor is required to transparently document a structured analysis of client's business risks and audit risks, which a document link to the audit procedures planned and conducted (Van Buuren, 2005).

Getting an understanding of the client's business is a separate audit task primarily in the planning phase, although risk analysis in general can be found in more phases of the audit since the auditor preliminarily assesses audit risks in the planning phase (based on prior year knowledge of the client and its environment) and evaluates audit risks after having performed tests of controls and substantive tests of transactions. Within the planning phase, the following audit tasks have been selected for further examination:

- The *identification of client's business risks*. The auditor searches for those client's business risks that may imply an important threat to the client's strategy and objectives. These business risks may also imply the risk of a material error in the financial statements (i.e., audit risk). Inputs in this information search may be prior year knowledge of the client's business, industry-specific templates, client's risk analyses, discussions with the client, etc.
- The *identification of client's entity-level controls*. Having identified the most important client's business risks, the auditor identifies those controls implemented by the audit client that are deemed to mitigate or monitor the client's business risks. Controls can be distinguished (see, e.g., PCAOB 2004, AS2 including the control deficiency evaluation framework issued December 20, 2004) into entity-level controls and transaction-level controls. Entity-level controls have a pervasive effect on the organization as a whole and are often – based on COSO (1992) distinguished into the following components: (1) control environment, (2) risk assessment, (3) information and communication, (4) control activities, (5) monitoring. In this thesis, the identification of entity-level controls task will be included in the research design. Transaction-level controls are internal controls that

[3] Bell *et al.* (1997, p.2) state: "It (the strategic Business Measurement Process) guides the focus, breadth and depth of the auditor's knowledge acquisition and the integration of business knowledge into expectations about financial-statement assertions."

"must be in place to see that records accurately and fairly reflect transactions in and dispositions of a company's assets; to provide assurance that the records of transactions are sufficient to prepare financial statements in accordance with generally accepted accounting principles and that receipts and expenditures are made only as authorized by management and directors; and to make sure that steps are in place to prevent or detect theft, unauthorized use or disposition of the company's assets… (PCAOB, AS2, 2004, p.2)." The identification of transaction-level controls task is not included in the design of this empirical study. The reason for including entity-level controls in the research design is because entity-level controls and entity-level knowledge acquisition are viewed as highly important aspects of the Business Risk audit approach (e.g., Bell *et al.*, 1997, p.13), potentially even more important compared to transaction-level controls.

- The *assessment of the impact of both client's business risks and entity-level controls on audit risk*. From Figure 2.1 it follows that the identified client's business risk factors are input for the inherent risk assessment (which is a separate component of the audit risk model) and that the quality of the identified controls are input for the control risk assessment (which is another component of the audit risk model) (see also Taylor, 2000, p.698; Eilifsen *et al*., 2001, p. 194). The auditor, having identified client's business risks and client's entity-level controls, hence, needs to determine their impact on audit risk. This task implies that the auditor attaches importance weights to the business risks and controls irrespective whether an audit firm makes use of a verbal audit risk model or a numerical audit risk model.

Examination of the auditors' judgment performance regarding the audit tasks selected in this thesis in particular is crucial to understanding the impact of any decision errors on the auditor's remaining audit procedures (e.g., tests of controls, analytical procedures and substantive testing). The majority of other research studies has been focused on these latter stages of the audit and has reported that audit working programs are not truly risk-based (e.g. Mock and Wright 1999). Bedard and Graham (2002) suggest that specific risk factors (instead of risk assessment) may provide this causal linkage. Recent international auditing standards have recognized this point in introducing the concept of 'significant risk' (ISA315, IFAC, 2003, p. 25 and following) for which special audit consideration (specific audit procedures) is required. The current empirical study might shed more light on this matter.

Task characteristics

Superior performance requires task-specific knowledge (e.g., Bonner, 1990; Tan and Libby, 1997). In applying the concept of task-specific knowledge in this thesis, it is important to distinguish audit tasks based on specific task-characteristics. In Table 2.1 the differences in task characteristics between the tasks 'identification of client's business risks', and 'identification of client's entity-level controls' on the one hand and 'audit risk assessment' on the other hand are compared. This distinction also bears relevance for the research hypotheses, since different hypotheses will be developed for identification and assessment tasks. Differences in task structure are expected to have different implications for the relationship between experience and the auditor's judgment performance. See further section 2.4 where research hypotheses will be described in more detail.

Table 2.1 Audit task characteristics (adapted from Abdolmohammadi, 1999)

	Tasks		
	Identification of client's business risks	**Identification of client's entity-level controls**	**Assessing impact of business risks and controls on audit risk**
Task characteristics	Less well defined cues	Less well defined cues	Number of cues dependent on previous two tasks.
	Number of cues unknown	Number of cues unknown	Number of cues dependent on previous two tasks
	Requires much judgment	Requires much judgment	Requires much judgment
	Nature of task: search process (both internal and external sources)	Nature of task: search process (both internal and external sources)	Nature of task: judgment process related to importance of cues
	Output: list of significant cues	Output: list of significant cues	Output: risk assessment
Conclusion	**Relatively unstructured**	**Relatively unstructured**	**Relatively structured**

Table 2.1 suggests that the identification tasks selected in the experiment are categorized as relatively unstructured while the assessment task is categorized as relatively structured. With respect to the audit task 'identification of client's business

risks' auditors may make use of decision aids like business industry-specific risk-frameworks. The auditor, however, needs to tailor these frameworks to a client-specific case-setting since each audit client has its own specific strategy, organizational objectives, competitive position, and resulting business risks. This tailoring process requires substantial professional judgment. According to section 31, ISA 315 (IFAC, 2003, pp. 10), the auditor does not have the responsibility to identify or assess all business risks based on the argument that business risks are by definition broader than the risks of material misstatement of the financial statements. However, the identification of business risks increases the likelihood of identifying the risks of material misstatement. In addition, ISA 315 ('Understanding the Entity and Its Environment and Assessing the Risks of Material Misstatement', 2003, Appendix 3) provides examples of conditions and events (business risks) that may indicate the existence of the risk of a material misstatement.

The audit task 'identification of entity-level controls' is – in conformity with the classification of the task 'identification of client's business risks – categorized as relatively unstructured. These two tasks share the same task characteristics although the potential for judgment errors with respect to the identification of client's entity-level controls may differ from judgment errors with respect to identification of client's business risks because the inputs for the tasks differ. For the identification of client's business risks, the auditor's judgments is based on, for example, industry-specific knowledge databases, experiences with other audit engagements, and interviews with key personnel of the audit client. For the identification of client's entity-level controls, inputs to the auditor's judgments are, for example, client's business risks identified in an earlier stage, descriptions of client's control framework etc. So, the auditor's judgments on client's controls may be dependent on the auditor's judgments on risk identification. Given complexities and dynamics in the client's control environment, the identification of controls is a difficult task. Prior research (e.g., Dirsmith *et al*. (1991, p.268) suggested that independent auditors may not be well equipped to fully understand the role, nature and implications of the strategic planning process in dynamic and complex client contexts. At the time of their study, it appeared that contemporary independent auditing standards were deficient in their neglect of client strategic planning. Recently, auditors have been provided with more guidance compared to the beginning of the nineties, both in terms of new issued international auditing standards and in terms of auditing textbooks (e.g., Knechel, 2001) and firm-specific guidance. Nonetheless, the task is by nature difficult, given the dynamics and complexity of the client's business environment.

According to prior research studies related to complex, unstructured audit tasks (e.g., Abdolmohammadi and Wright, 1987; Bedard and Biggs, 1991; Bonner 1990), it is expected that domain or task-specific experience contributes to increased judgment performance with respect to the audit tasks selected in the experiments. In addition to examining the impact of task-specific experience on the auditors' judgment performance, this thesis also investigates the impact of industry-specific experience on the auditors' judgment performance. Auditors with more industry-specific experience potentially have developed a more thorough understanding of the client's industry and – hence – potentially identify more or more accurate business risks and mitigating controls.

From the previous discussion on task-characteristics, it follows that examination of the audit tasks selected in the experiments is expected to be of benefit to audit practice (because of the relative novelty of the business risk audit approach in the area of the selected audit tasks in particular) and to auditing research. Given the relatively little number of research studies published with respect to the business risk audit approach (e.g., Kotchetova, 2002; O'Donnell and Schultz, 2003), the research study in this thesis will also contribute to existing auditing research literature.

2.2.2 Audit firms' industry-specialization

Concurrently, with developing the business risk audit approach, audit firms organized themselves along industry-service lines (Gramling and Stone, 2001, p.1). Craswell *et al.* (1995, p.304) reported that only Big8 audit firms in Australia were to some extent specialized in certain industries (see also Solomon *et al.*, 1999, p.191). A later study (DeFond *et al.*, 2000) reported that at least one non-Big8 firm also is specialized in a specific industry, namely the Property-industry (Hong Kong). Specialization in industries can result in economies of scale for audit firms, although this not automatically results in lower audit costs. Even the opposite seems to be true. Fees of industry-specialists show on average premiums of 30% compared to non-specialized firms (Craswell *et al.*, 1995; Ferguson *et al.*, 2003). Economies of scale can also be found in terms of an improved auditors' knowledge base and experience effects are likely to occur (see section 2.3). Hence, industry specialization potentially impact both audit efficiency and audit effectiveness. To the extent that accounting policies are industry-specific (e.g., the industry of financial services with complex financial instruments or finance arrangements), industry-specialization is necessary in order to conduct effective audits. Hogan and Jeter (1999, p.15) state that "the benefits of industry expertise or

specialization are likely to increase with the complexity of the industry." They also reported greater audit firm concentration in regulated industries compared to non-regulated industries. Craswell *et al.* (1995, p.304) argue that industry-specialization is not necessarily connected to a specific (Big8) audit firm as a whole, but the level of industry-expertise is determined by (unique personnel of) a specific office of the audit firm. Industry-expertise is acquired through experience when auditing specific industry-related clients. These authors argue that it is unlikely that networking externalities are determinant to industry-specialization.

Relevant for our study is the question to what extent industry-specialization contributes to audit quality or the auditors' judgment performance[4]. An overview of existing literature on this relationship will be described in the following sections of this Chapter. In paragraph 2.2 we have provided an introduction into the business risk audit approach and the development of industry-specialization. These two topics provide the context of this empirical study. The central research question of this study is concerned with the auditor's judgment performance regarding the business risk audit approach. Derived from this general research question is the question to what extent experience (general, industry-specific, and task-specific experience) contributes to the auditors' judgment performance on specific tasks of the business risk audit approach. With that objective in mind, the next section deals with the auditors' judgment process in general.

2.3 Judgment performance of the auditor

This section is concerned with the quality of the auditors' judgment process. An important goal of examining the auditors' judgment process is to detect areas where these judgments can be improved (e.g., Ashton, 1985, p.173). Since the seventies of the last century, many accounting research studies have been published dealing with the auditors' judgment process. In 1984, Gibbins stated that "we do not yet have a good understanding of what happens when experienced people, such as public accountants, use their judgments to make decisions that matter, amid the pressures, constraints, dangers, and opportunities of their everyday environment (Gibbins, 1984, p.103). Since 1984, researchers in the auditing discipline have learned a lot more about judgments and decisions of auditors although much still is left open for further investigation. The

[4] If auditees voluntarily contract with higher-priced industry specialists even though any licensed auditor can legally perform audits, then this is evidence that quality-differentiated audits based on industry-expertise are economically demanded" (Craswell *et al.*, 1995, p.299).

current empirical study aims at contributing to the auditing research literature by examining aspects of the auditors' judgment process with regard to the business risk audit approach.

Since the introduction of the business risk audit approach, only a few studies were published, In particular regarding the task 'identification of risk factors' (Bedard and Graham, 2002, p.40) relatively little empirical studies were published. In section 2.2 it was argued that the business risk audit approach in particular involves significant judgment and broad skills of the auditor. The auditor should for example be able to "assess the position of a business in its environment, matters of strategy, operation and finance (Lemon *et al.*, 2000, p.22)." Practicing auditors have not been made familiar with these topics in the CPA courses. Given the fact that professional standard setters recently came up with guidance regarding the business risk audit approach (e.g., ISA315, IFAC, 2003), auditor's knowledge and skills before 2003 are expected to be highly generated by practical experience and firm-specific guidance. Prior to 2003, generally applicable guidance regarding the concept of 'business risk' was not made available to the audit firms.

Judgment biases in general

The auditor's judgment performance is directly concerned with audit quality. It is known from psychological research studies that every individual – whether expert or not – is prone to biases (i.e., systematic errors, Conlisk, 1996, p.670; see also Einhorn and Hogarth, 1981) in judgment and decision-making processes. Conlisk (1996) for example provides an extensive list of such biases in which people: "display intransitivity, misunderstand statistical independence, mistake random data for patterned data and vice versa, fail to appreciate law of large number effects, fail to recognize statistical dominance, make errors in updating probabilities on the basis of new information, misunderstand the significance of given sample sizes, fail to understand co-variation for even the simplest 2*2 contingency tables, make false inferences about causality, ignore relevant information, use irrelevant information, exaggerate the importance of vivid over pallid evidence, exaggerate the importance of fallible predictors, exaggerate the ex ante probability of a random event which has already occurred, display over-confidence in judgment relative to evidence, exaggerate confirming over disconfirming evidence relative to initial beliefs, and give answers that are highly sensitive to logically irrelevant changes in questions." With respect to the business risk audit, O'Donnell and Schultz Jr. (2005, p.921) reported a so-called 'halo-effect' which is a "marked tendency to think of the person in general as rather good or rather inferior and to color the judgments of the person's specific performance attributes by this general feeling." With respect to the

business risk audit, O'Donnell and Schultz jr. examined the question whether auditors who conduct a business risk audit (specifically the strategic risk assessment as part of the holistic perspective of the business risk audit approach) are less likely to adjust account-level risk assessments for inconsistent fluctuations. These authors found support for this hypothesis. This study hence clarifies how procedures in the planning phase may have consequences for the judgment process in later phases of the financial statement audit.

Judgment biases in auditing

Auditors are prone to the same biases compared to other individuals. However, biases are often task-specific. In the next sections we will deal with judgment biases - specific to the tasks selected in this empirical study – we expect to be present in the dataset of this study.

An objective of research regarding judgment processes is to provide directions for improvement of judgment and decision-making. If we compare the list of biases above with the perception of auditing standards which state that the auditor exercises professional judgment and professional skepticism, the question rises whether and to what extent audit firms and individual auditors have learned from previous research results. Audit firms have put controls in place in order to mitigate the biases to an acceptable level. The following examples (not limitative) are provided. First of all, auditors show learning from experience[5]. In sections 2.4 and 2.5 this topic will be discussed in more detail, as experience is not always a good predictor of improved performance. Secondly, part of the quality control procedures of audit firms is the (internal) review process (e.g., Libby and Trotman, 1993; IFAC, ISQC1, 2003) and the concept of 'accountability' (review awareness) although accountability can also contribute to another bias in judgment, for example conservativeness (Glover 1997). As a sub-aspect of the second argument, judgments can be formed by individuals and by groups of auditors. In recent years, there is a tendency towards more group judgment and decision-making. Examples of group- or team-based judgment processes are team planning events, team meetings in the period between preliminary and final audit, and team wrap-up events (after final audit has taken place). A third example of an audit firm control is the use of decision aids like checklists, industry-specific templates, etc. Audit firms have to consider carefully how decision aids are composed, since decision aids also can result in other judgment biases. Bedard and Graham (2002) provide, for

[5] "Learning is promoted by favorable conditions such as rewards, repeated opportunities for practice, small deliberation cost at each repetition, good feedback, unchanging circumstances, and a simple context. Conversely, learning is hindered or blocked by the opposite conditions (Conlisk, 1996, p.670)."

example, evidence of the impact on auditors' judgment performance of differences in positively and negatively used wordings. Another example might be whether risk assessments in a decision aid are presented in words (e.g., low, medium, high) or in numbers (e.g., 0-9) (Dilla and Stone, 1997). A final example of audit firm controls is the required partner rotation from an engagement after seven years. These controls can all serve as mechanisms to mitigate bias in individual judgment and decision-making. Despite these control mechanisms, research studies still report biases in auditor's judgments (e.g. Tubbs *et al.*, 1990; Tuttle and Stocks, 1998).

Judgment biases related to audit tasks selected in this thesis

The identification of client's business risks task and the identification of client's entity-level controls task share the characteristic of searching for information and selecting it for further consideration during the audit. Compared to for example the audit risk assessment task, identification tasks are more complex because of making a selection of those risks and controls which are deemed to be relevant to the financial statement audit. Assessment tasks as defined in the design in this thesis, however, are based on identified risk factors and entity-level controls in an earlier stage of the audit and only ask for judgment regarding the impact of those risk factors and entity-level controls on audit risk. The identification of client's business risks and entity-level controls comprises both information search and storage in memory (Einhorn and Hogarth (1981, p.10). In the search for information a potential bias in the auditor's judgment process is 'selective attention'. I.e., the auditor will not pay equal attention to each of the potentially relevant cues (risks and/or controls). A second potential bias is the so-called 'dilution-effect' (Glover, 1997). A dilution-effect occurs when an individual ignores relevant information and/or selects or over-emphasizes irrelevant or less-relevant information. It is imaginable that the business risk audit approach results in more cues to be dealt with, and that the 'dilution' bias more frequently occurs compared to the more traditional audit approaches. This judgment bias might be mitigated to a certain extent by the use of checklists (e.g., Bonner and Pennington, 1991) developed by the audit firm, allowing auditors to better identify the relevant client's business risks and entity-level controls. A third potential judgment bias with respect to identification tasks is the presence of 'anchoring'. Based on prior experiences, an individual develops "strong initial views which are resistant to change because they influence the way that subsequent information is interpreted (Slovic, 1987)." New information which is contrary to this initial view is not appropriately considered in the auditor's judgment process (confirmation/disconfirmation bias) because this is viewed as unreliable, inaccurate, or not representative. 'Novice' auditors may be more prone to confirmation bias compared to 'expert' auditors (Kaplan and Reckers 1989; Bonner and Pennington, 1991), although

even experts can ignore or overlook relevant information (see for example Ballou *et al.*, 2002). Ballou *et al*. reported that auditors typically overlooked or underweighted critical information when a client's strategic position was consistent with industry averages (see also Early, 2002).

The auditor is expected to frequently draw experiences of events from his/her long-term memory given the presence of time- and budget pressure. These events originate both from the audit client for which the business risks are identified as well as from other client's environments. In addition, the auditor derives risk-information both from the knowledge databases available within the audit firm and client-specific information sources (like strategic plans, information from interviews with key personnel, etc.). Once the appropriate risks and controls have been identified, the auditor is required to assess the impact of these cues on one single variable (audit risk) which is both a more traditional task with which the auditor is experienced as well as a relatively easy task.

2.4 Development of research hypotheses

In this section, existing auditing research studies will be described which are relevant to the research questions of this empirical study, which are:

- Is the auditors' judgment performance influenced by the level of the auditors' experience?
- Is the auditors' judgment performance influenced by the perceived level of feedback when performing risk assessment tasks?
- Is the auditors' judgment performance influenced by the level of risk-aversion?

Subsequently, the research hypotheses following these research questions will be discussed.

2.4.1 The potential impact of experience on judgment performance

From the seventies to approximately the midst of the eighties in previous century most of the experience-related auditing research has used general experience – measured as the number of years the auditor is experienced in the auditing field – as measure of the potential impact of experience on judgment performance. Based on the mixed results these research studies presented, it was suggested that experience was only a useful concept when it was specified to the audit task selected in experiments. Indeed, an

auditor can be employed an entire life at an audit firm, but during this employment probably can conduct only a selective number of audit tasks. Since the midst of the nineties, when the worldwide (in The Netherlands then Big6) audit firms specialized in specific industries, research studies emerged which used industry-specific experience when measuring the impact of experience on judgment performance. In this empirical study, the impact of the three categories of experience on judgment performance will be considered. In this section, a review of studies related to these categories of experience will be subsequently discussed.

General experience

Gibbins (1984, p.105) argues that "experience, whether direct or indirect (as via education), is crucially important in bringing structure to the judge's psychological process". Gibbins (1984, p.106) continues with proposing that experience is helpful in producing a pre-structured guide to the auditor's judgment. These guides are based on the fact that knowledge is stored in and retrieved from long-term memory. More experienced auditors have relatively better developed knowledge structures in their long-term memory, making it more efficient to retrieve this knowledge from memory. On the other hand, it is expected that more experienced auditors form judgment based on intuition compared to less experienced auditors, because more knowledge is available which can be used and less time is needed to think in judgment processes. Auditing research literature has – however – produced mixed results on the impact of experience on the auditor's judgment performance (e.g. Bonner, 1990). In earlier studies (before 1990), the main conclusion was that general experience did not contribute to judgment performance (e.g., Ashton 1974, Hamilton and Wright 1982; Slovic, 1972). See Wright (1988) for a complete review of these and other related studies. This makes Trotman (1998) conclude that "with hind-sight there was little reason to expect experience effects in these studies" (Trotman, 1998, p. 136) because many of the research studies referred to included relatively well-structured audit tasks, such as internal control evaluation. Trotman (1998, p.136) specifically points out that many of these tasks "did not include components such as cue selection where knowledge is likely to improve performance." It was suggested (e.g., Hamilton and Wright, 1982) that the auditor's judgment performance would be positively associated with the auditor's years of experience with respect to semi-structured and unstructured tasks (e.g., Abdolmohammadi and Wright, 1987).

As described in section 2.4, the tasks ‘identification of client’s business risks’ and ‘client’s entity-level controls’ are less structured compared to ‘assessment tasks’. With respect to the relatively *unstructured task* of materiality and disclosure judgments, Messier (1983) reports that audit partners with more than 15 years of experience show higher levels of consensus compared to less experienced audit partners.

Abdolmohammadi and Wright (1987) also examined the auditor’s judgment performance with respect to determining the appropriate disclosure for a proposed audit adjustment, and reported differences in judgment performance between more experienced and less experienced auditors. They found that experienced auditors were significantly less likely to require an adjustment or a qualified opinion compared to the less experienced auditors.

Kaplan and Reckers (1989) examined the initial planning process of auditors. Auditors were provided with the results of analytical tests and were asked to assess the likelihood that fluctuations were caused by accounting errors or environmental changes (initial belief). Subsequently, auditors were asked to indicate the information they would seek in response to the test results. Kaplan and Reckers found that auditors’ initial beliefs were systematically associated with experience which provides an indication that experience contributes to judgment performance in an information selection task (i.e. more experienced auditors were less prone to anchoring effects in this task). Kaplan’s and Reckers’ study provides support for a positive association between the auditor’s judgment performance and general experience.

In an experiment, Bonner (1990) reported judgment out-performance for more experienced auditors in selecting analytical risk factors. Her study compared a relatively structured task (control risk procedures) with a less structured task (analytical risk procedures). This provides evidence that the task-structure is of relevance when assessing the impact of general experience on the auditor’s judgment performance. General experience alone is, hence, insufficient as an explanatory variable for differences in judgment performance across auditors.

A comparable result has been reported by Frederick (1991) with respect to the task ‘retrieval of internal control knowledge from memory’. Frederick (1991) concluded that experts and novices differ with respect to knowledge structures and memory. In domains where specific knowledge is required for performing an audit task appropriately, experts are assumed to outperform novices. Experts differ from novices with respect to internal control knowledge in making use of both taxonomy knowledge structures (e.g.,

knowledge ordered by control objectives) and schematic knowledge structures (e.g., significant classes of transactions). This enables experts to retrieve more cues and/or better order retrieval of cues.

Additionally, Simnett (1996) reports that in an *information selection* task, information load (the number of cues included in experiments) is a limiting factor for predictive judgment accuracy, but that this information load was partly mitigated by experience effects. The information selection task in his experiment constituted the selection of financial ratios out of a menu of potential ratios which were of relevance in predicting a corporate bankruptcy. Of particular interest to the current empirical study, is Simnett's finding that this effect did not occur for an *information processing* task (i.e., assessing the likelihood of a corporate failure based on financial ratios).

A more recently conducted study of Bedard and Graham (2002, p.53) reports that general experience in auditing did not improve the auditors' judgment performance in risk factor identification and audit planning. Repeated engagement experience on the other hand was found to improve the auditors' judgment performance in these tasks. Bedard and Graham particularly examined the impact of the wording of decision aids on the auditors' judgment performance in identifying client's risk factors. Their results indicate that negatively worded decision aids resulted in more risk factors being identified compared to those auditors who use a positively worded decision aid. Appropriately designed decision aids hence can be helpful in realizing improved judgment performance which potentially has a positive impact on audit effectiveness.

This section provided an overview of research studies related to the impact of the auditors' general experience in auditing on judgment performance. Mixed results have been reported. However, many of these studies (e.g., Trotman, 1998) also indicated that general experience may not be an appropriate measure of auditor expertise given the specific environment and personal attributes of auditors. A common finding in these studies is also that task structure potentially provides an explanation of the mixed findings (e.g., Early, 2002; Wright 1988). In a verbal protocol study, Biggs and Mock (1983) found evidence that suggested explanations for the supposed lack of association between general experience and judgment performance. In the first place, in the information acquisition phase of the audit, the search for relevant information may be incomplete, and secondly auditors prematurely close the judgment processes and do not assess all alternatives accordingly. In addition, auditors use different criteria in the evaluation of audit evidence (for example: efficiency criteria and/or effectiveness criteria). Biggs and Mock (1983) also argue that because of lack of normative solutions,

consensus between auditors is not naturally reached. Trotman (1998) adds to this by arguing that often relatively simple tasks were selected in research designs, making insufficient distinction between task components. As a result, experience differences related to relatively simple tasks cannot be expected. An additional argument of Trotman (1998) is that auditors with the same general experience have different specific experiences. An increase of general experience is, hence, expected to result in deviations from optimal decision making. As a result, a negative impact of general experience on judgment performance in assessment tasks is expected. For more unstructured tasks like identification tasks, the auditor is expected to benefit from general experience, since the auditor's performance is driven by his/her abilities (and is expected to be less driven by client-specific experiences since the auditor does not make use of general frameworks or knowledge databases in an assessment task) which are expected to have benefit in the process of searching for information and storage of information in the auditor's memory.

Analysis of prior research on the impact of the auditors' experience in auditing gives rise to the following hypotheses:

H1a: The auditor's judgment performance with respect to the tasks 'identification of client's business risks' and 'identification of client's entity-level controls' correlates positively with general experience.

H1b: The auditor's judgment performance with respect to the task 'assessment of the impact of client's business risks' and client's entity-level controls on audit risk' correlates negatively with general experience.

Industry-specific experience

In recent years, steadily more research has been conducted regarding the impact of industry-specific experience on the auditor's judgment performance. However, the impact of industry-experience on the auditors' judgment performance related to the specific tasks selected in the current research design has received little attention.

Taylor (Taylor, 2000, p.698-699) provides a summary of the knowledge base characteristics of auditors who specialized in a specific industry:

1 Knowledge of specific errors related to the account and the relative frequency of those errors (Owhoso *et al.*, 2002; Ashton 1991);

2 Knowledge of the types of procedures and policies that are typically in place to prevent, detect, and correct such errors (Libby 1985; Libby and Frederick 1990);
3 Knowledge of error (Bédard and Biggs 1991) and non-error explanations of unexpected analytical review results (Solomon *et al.*, 1999);
4 Knowledge of unique industry audit risks (Wright and Wright 1997);
5 Knowledge of environmental, economic, and contextual factors that influence the likelihood of errors (Kreutzfeldt and Wallace 1986); and
6 Knowledge of the dynamics of the industry and how those dynamics may affect incentives to misstate financial information in general (Solomon *et al.,* 1999).

One of the first studies regarding the impact of industry-experience on auditors' judgment performance was Bedard and Biggs (1991a). This study examined an analytical procedures task in the context of manufacturing industry experience and domain-specific experience (experience related to the account inventory). They reported that industry-experienced auditors were better able to identify seeded errors in client's data.

Wright and Wright (1997) conducted an experiment with auditors specialized in the retail industry. They included four material errors in the case, of which three errors were related to the retail industry. Results of the experiment indicated that industry experience significantly enhanced hypothesis generation in error identification but did, however, not result in expected risk assessments.

In their experiment with banking and health care industry specialized auditors, Solomon *et al.* (1999) reported that industry-experience resulted in relatively more non-error-knowledge (e.g., a better understanding of client's business), but did not significantly contribute to error-knowledge (e.g., knowledge of occurrence and categories of financial statements errors across or within industries).

Taylor's (2000) study revealed that non-specialized auditors were more conservative and showed less self-confidence in their industry-specific decisions compared to industry-specialized (banking) auditors. His results further indicated that auditors experienced in the banking industry showed higher judgment performance in an inherent risk assessment task for an industry-specific financial statement account (loans receivable) compared to non-industry-experienced auditors. Differences in judgment performance, however, related to a not-industry-specific financial statement (property and equipment) were not as great as those related to the selected industry-specific account.

Erickson *et al.*, (2000) analyzed the Lincoln Savings & Loan (LSL) audit failure. Their main conclusion regarding the audit failure was "that the most significant shortcoming in the LSL audit was the auditor's failure to obtain and use knowledge of LSL's business, the industry in which it operated, and the economic forces that influenced this industry/business (Erickson *et al.*, 2000, p.168)." From this argument, it can be derived that these authors assume that an increase in industry knowledge and experience would result in higher judgment performance, which in the LSL case even might have prevented audit failure. Hence, they argued that industry experience potentially would constitute the most important determinant of auditor expertise.

Comparable with Erickson *et al.* (2000), Gramling and Stone (2001) argue – based on Kwon (1996) – that auditors experienced in a specific industry, are better positioned to assess the reasonableness of clients' estimates and other financial representations, thereby reducing the client's discretion in applying accounting principles.

Since no previous research studies were directed towards investigation of the impact of industry-experience on judgment performance regarding the identification of client's business risks and entity-level controls task, our research hypothesis has to be developed by "reasoning by analogy with other audit tasks". For the majority of studies, a positive contribution of industry-experience to the auditors' judgment performance has been reported.

Based on the literature review presented in this section, the following hypothesis will be tested:

H2: The auditor's judgment performance with respect to the tasks 'identification of client's business risks', 'identification of client's entity-level controls', and 'assessment of the impact of identified client's business risks and client's entity-level controls on audit risk' correlates positively with industry-experience.

Task-specific experience

Provided the mixed results which have been reported in previous research studies regarding the impact of general experience on judgment performance, Hamilton and Wright (1982) suggested that adding more domain-specific information to background materials in case settings, experience might significantly more influence the auditors'

judgment performance. Later studies (e.g., Colbert 1989; Bonner 1990) have used this as an argument to develop other measures of expertise related to experience: domain-specific or task-specific experience. This was based on the argument that auditors with the same level of general experience are likely to have different specific experiences (like task-specific experience) and training (Bonner and Lewis, 1990; Libby 1989). Additionally, different auditors show different learning patterns over time. Domain-specific knowledge is gained through experience and instruction (Solomon *et al.*, 1999). In the cognitive psychology discipline, Alba and Hutchinson (1987) found that generally an increase in task-familiarity contributed to judgment performance showed in that task.

Bonner and Lewis (1990) reported that experienced auditors showed higher judgment performance compared to less experienced auditors. Further investigation of the composition of this experience effect showed that general experience only explained 10% of the variance. In contrast, most of the proportion of variance was explained by task-specific training and task-specific experience.

Bonner was one of the first researchers who examined the concept of task complexity for which no well-accepted definition exists (Bonner and Pennington, 1991, p.38-39). In one of her studies (Bonner, 1990), she conducted an experiment with two tasks (control risk assessment and analytical procedures risk assessment) which differed in task complexity. Analytical procedures risk is a sub-set of detection risk and is defined as: the risk that analytical procedures will fail to detect a material error. Bonner (Bonner, 1990, p.77) argues that the control risk assessment task is performed by relatively inexperienced auditors where analytical procedures risk assessments are performed by more experienced auditors. In other words, relatively inexperienced auditors are assumed to have a good developed knowledge base regarding control risk assessments, and are also assumed to develop their knowledge base through experience regarding analytical procedures risk assessment. For each of these tasks, both the selection of cues (identification of the factors impacting the assessment decision) and the impact assessment were included in the experiment. Results indicated that task-specific knowledge was positively associated to the auditors' performance only in the analytical procedures risk assessment task (the complexity of this task was higher compared to the control risk assessment task). Although this study has highly contributed to the existing research literature, Bonner's experiment in the selection tasks was limited to selecting risk factors from a pre-defined list of risk factors which contained both targets and distracters. Experiment participants were requested to select the most appropriate risk factors from this list where judgment performance was measured in terms of the number of accurately selected targets. From a real-world perspective the

selection task is quite more complex than 'ticking boxes' on a pre-defined list. It is hence questionable whether and if so, to what extent, similar results would occur if the experiment had come more close to real-world settings. In the current study, no pre-defined list of risk factors and entity-level controls will be provided to the participants. This research design issue may, as a result, contribute to existing research literature, by providing more clarity regarding the auditors' judgment performance regarding the complex task of identification of client's business risks and entity-level controls.

Researchers examined the impact of task-specific experience (others – e.g., Solomon *et al.*, 1999 use the term 'domain-specific' experience) in a variety of tasks. For example, Bedard and Biggs (1991a) investigated the task of evaluating management representations, based on recognition and recall, related to the analytical procedures task. Management representations may constitute audit evidence, although this type of audit evidence is generally less persuasive compared to inspection of documentation and management's response in explaining deviations or fluctuations in financial results, might be biased. In this experiment, Bedard and Biggs reported that domain-specific experience was more highly associated with improved judgment performance compared to experience in general. In another study, Bedard and Biggs (1991b) found that managers were better than seniors in explaining a recognized pattern of cues. This suggests that general experience (as proxied by rank) indeed can be an important determinant of the auditors' judgment performance. However, general experience as such was not sufficient to produce accurate judgments, since many of the participating managers did not generate correct hypotheses. In accordance with Davis and Solomon (1989) it is proposed that specialized experience (here meant as task-specific or domain-specific experience) is more likely to result in more rapid, efficient accumulation of representative error patterns.

Based on these studies – although the tasks investigated in previous research studies are not fully matching to the tasks examined in the current study – it can be preliminary concluded that previous research indicates that task-specific knowledge for some audit tasks contributes positively to the auditors' judgment performance. Later studies (e.g., Solomon *et al.,* 1999) have not produced dissimilar results. This resulted in the following hypothesis:

H3: The auditor's judgment performance with respect to the tasks 'identification of client's business risks', 'identification of client's entity-level controls', and 'assessment of the impact of identified client's business risks and client's entity-level controls on audit risk' correlates positively with task-specific experience.

2.4.2 The potential impact of feedback on judgment performance

Section 2.4.1 provided an overview of existing research studies regarding the impact of experience on judgment performance. However, the auditor not only gets experience from direct practical experience, e.g. by conducting an audit task, but also acquires expertise by receiving feedback from supervisors and indirect education requirements (Colbert 1989, p.137).

Feedback

People generally are limited in their ability to process information in uncertain environments (Balzer *et al.*, 1989, p.410). What mechanisms may be in place to deal with this limitation? Among others, feedback mechanisms may enhance learning from past judgments (e.g., Davis and Solomon, 1989). Feedback has been defined as "the process by which an environment returns to individuals a portion of the information in their response output necessary to compare their present strategy with a representation of an ideal strategy" (Balzer *et al.*, 1989, p.410).

Feedback and identification tasks

In an identification task (e.g., the identification of client's business risks), auditors - besides using other knowledge sources - retrieve information from their long-term memory. As described in section 2.3 the auditor probably experiences bias in this recall process (for example confirmation/disconfirmation bias). Libby and Trotman (1993) conducted an experiment examining whether a review (feedback) mechanism would result in adequate consideration of evidence that was inconsistent with initial judgments. It is assumed that the initial decision maker and the reviewer use the same evidence in the working papers. An auditor (in his/her role of initial decision maker) compares current evidence with evidence recalled from prior audits of the engagement under consideration and evidence from other engagements. If this recall mechanism does not work appropriately (the initial decision-maker can either recall consistent or inconsistent evidence), the reviewer's judgment process potentially will be influenced. The results of Libby's and Trotman's experiment suggested that a review process indeed can serve as an appropriate control mechanism by increasing the likelihood that inconsistent evidence is sufficiently considered, suggesting that the review mechanisms serves as an effective control (Libby and Trotman, 1993, p.559). This finding is consistent with cognitive psychology research which suggests that, because of their more well-developed knowledge structures, more experienced reviewers will be better positioned to detect

and recall inconsistent information (e.g., Alba and Hutchinson, 1987). Ballou (2001) conducted an experiment in which auditor characteristics in the review process were examined. The dependent variable in this study was the number of review notes made by the participants. Review notes were distinguished into evidence-oriented and documentation-oriented review notes. Evidence-oriented review notes referred to those review notes in which the reviewer requests the preparer of the audit documentation seeking additional evidence to sufficiently corroborate or refute management's explanations. Documentation-oriented review notes referred to those review notes which ask for additional documentation where the conclusion of the preparer of the documentation is not at stake. Of interest to the current study is that Ballou (2001) reported a negative association between the number of evidence-oriented review notes and general experience (no significant association between the number of evidence-oriented review notes and task-specific experience). On the other hand, a significant positive association was reported between the number of documentation-oriented review notes and task-specific (review) experience. Note that the number of review notes is in Ballou's study a dependent variable, while feedback in the current study is an independent variable (measured in number of times a specific task has been performed and number of hours spent on a specific task). It would require further examination whether and, if so, to what extent general experience and task-specific (review) experience are inversely related to each other; this would imply that the review task is more often performed by less experienced auditors in audit practice.

Feedback and accountability

Tan (1995) conducted an experiment in which he investigated the preventive effect of an announced review that would take place. Professional guidance (e.g. AICPA 1988, sec. 320.02) addresses the importance of such reviews as quality control device. From previous research it has been documented that the 'threat' of an upcoming review[6] (whether internal or external to the audit firm) will result in increased cognitive effort in the recall process (Tan, 1995, p. 115). On the other hand, previous research suggested that auditors, e.g. because of time pressure, rely more on their memory than on previous year's working papers, which potentially results in the bias of selective attention (the bias that relevant information will be ignored and irrelevant information will be over-weighted). Tan found support that accountability resulted in higher levels of judgment performance as measured by consensus and self-insight. Compared to the study of Libby and Trotman (1993), there is evidence that both the actual review process as well as the threat of a potential review result in improved judgment performance.

[6] This refers to the concept of 'accountability'.

Feedback and providing instructions
Feedback mechanisms may be related to individual audit tasks (written or verbal comments of the reviewer) and feedback at the end of the audit. The quality of feedback is dependent on the level of knowledge of the superior, time constraints and the superior's motivation for reviewing (Bonner and Pennington, 1991). Bonner's and Pennington's study focused on feedback related to individual tasks. Better judgment performance of the auditors is associated with tasks in which they receive more instruction compared to the tasks in which auditors receive no instruction. In addition, these researchers found that "expert performance tends to be better for tasks with good learning environments for the initial acquisition of the knowledge needed. These learning environments include extensive instruction prior to practice and feedback that is timely, accurate, complete and useful".

Feedback and assessment tasks
In a study, conducted by Ashton (1990), it is suggested that feedback might contribute to increased judgment consensus related to audit risk assessments, but only in the case-setting where no decision-aid is used. A typical difficulty in audit practice in providing feedback on audit risk assessments is that no accuracy criterion is available which poses constraints on the type of feedback that supervisors are able to provide to the reviewees, because a high level of audit risk for a specific account and/or assertion does not always result in material financial statement errors.

Based on the review of prior literature, the following hypothesis will be tested:

H4: The auditor's judgment performance with respect to the tasks 'identification of client's business risks', 'identification of client's entity-level controls', and 'assessment of the impact of identified client's business risks and client's entity-level controls on audit risk' correlates *positively* with feedback received from supervisors when conducting audit risk assessments.

2.4.3 The potential impact of risk-aversion on judgment performance

The sections 2.4.1 and 2.4.2 were concerned with experience and feedback as potential determinants of the auditor's expertise. This section deals for the current empirical study with a final potential determinant of expertise, namely the level of risk-aversion. As

opposed to the previously described determinants, this determinant is viewed as a personal trait which would apply to all people, not the group of auditors in particular.

In every day's life, individuals are faced with uncertainty and with exposure to risk. In addition, people are living in an environment in which their perceptions are influenced by family and friends' perceptions, and events that take place in their lives (Slovic, 1987). In cognitive psychology, often a distinction is made between novices and experts. Given the uncertainty in every day's life, even experts' decisions may be based on their intuition, rather than on evidence or rationality. In section 2.3, it was argued that even experts are prone to judgment biases. In this section we will examine existing literature regarding the impact of risk-aversion on judgment performance.

The level of risk-aversion as potential determinant of expertise has until now received little attention in auditing research.

Slovic (1987) stated, based on earlier research, that "disagreements about risk should not be expected to evaporate in the presence of evidence. Strong initial views are resistant to change because they influence the way that subsequent information is interpreted. New evidence appears reliable and informative if it is consistent with one's initial beliefs; contrary evidence tends to be dismissed as unreliable, erroneous, or unrepresentative (Slovic, 1987, p.281)." This tendency is also known as "anchoring". From the perspective of the audit task which is subject of the current empirical study, auditors show a conservatism bias (Smith and Kida, 1991). Shelton (1996) suggests that this conservatism bias may be enhanced by accountability. Conservatism may be defined in terms of sticking to prior beliefs (which is a form of 'anchoring') but also to being risk-averse in general. With regard to the audit task 'identification of client's business risks' auditors may for example show that they identify more risk factors than would be appropriate for the sake of completeness of documentation. The business risk audit approach is indeed a *risk-based* approach, but from a theoretical perspective risk identification is not an objective in itself, but rather should direct the auditor's attention to areas for more specific audit consideration. ISA 315 (IFAC, 2003) even states explicitly that the auditor does not have a responsibility to identify or assess *all* business risks. Nonetheless, from an accountability perspective, the auditor may have a drive to search for negative information (i.e., risk factors) (see for example Anderson and Maletta, 1999). Bhattacharjee and Moreno (2002) reported that less experienced auditors assessed risk higher based on information which was negative by nature compared to the more experienced auditors. Cohen and Kida (1989) suggested that auditors insufficiently take positive evidence into account in an analytical procedures task. If their

results would also apply to an identification task setting, it can be argued that risk-averse auditors would pay less attention to identification of the most appropriate control mechanisms, which can be viewed as ‘positive’ evidence.

The concept of risk-aversion is not assumed to have a direct relationship with the auditor’s judgment performance related to the identification tasks selected in the research design. Hence, research hypotheses were not developed. With respect to the auditor’s judgment performance in the assessment task, it is expected that risk-aversion will have some impact. For example, more risk-averse auditors may assess inherent risk higher compared to less risk-averse auditors when asked to decide on the impact of a given set of risk factors on inherent risk. Similarly, more risk-averse auditors may assess control risk higher (implying that they perceive relatively little control risk-reducing impact of a set of controls) compared to less risk-averse auditors. This, however, does not tell us beforehand in what direction the level of risk-aversion may impact judgment performance as measured by the auditor consensus. Thus, the direction of this relationship cannot be hypothesized. As a result, the statistical analyses will be exploratory by nature.

2.5 Summary and conclusions

In Chapter 2 an outline of previously conducted research related to the research questions of this empirical study has been provided. For each of the research questions, gaps in existing research were identified and research hypotheses were developed. These research hypotheses predict for both the identification and assessment tasks the impact of the independent variables on the auditor’s judgment performance, except for the ‘level of risk-aversion’ which will be exploratory examined. In the next chapter, the research design will be described, which will include a detailed description of the measurement of the research variables.

3 Research design

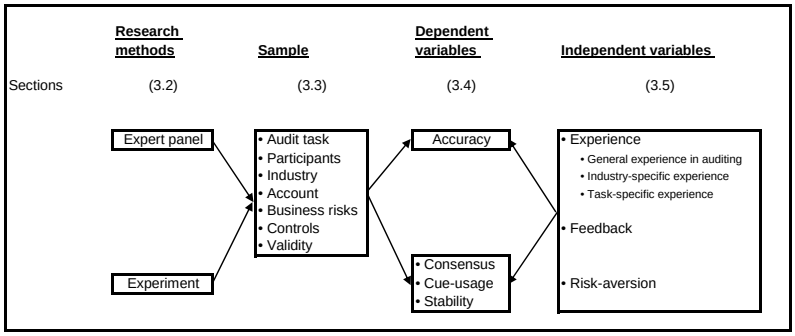
3.1 Introduction

Chapter 2 has presented an overview of existing literature relevant to the research questions of this thesis. The overall research question is concerned with the auditors' judgment performance with respect to the identification of client's business risks and entity-level controls and assessing their impact on audit risk in an assessment task. Specifically, this empirical study examines the impact of the following independent variables on the auditors' judgment performance:

- The auditor's level of experience;
- The auditor's perceived level of feedback when performing audit risk assessments;
- The auditor's level of risk-aversion.

In Chapter 2 research hypotheses were developed which were embedded in the existing research literature related to the research questions of this thesis. The purpose of the current chapter is to describe the research design of the empirical study. In addition, dependent and independent variables will be developed with the purpose of testing the hypotheses described in the previous chapter. Figure 3.1 presents the structure of Chapter 3.

Figure 3.1 Overview of research design of empirical study to assess the auditors' judgment performance



3.2 Research methods

The purpose of the empirical study is to examine the auditor's judgment performance with respect to the identification of client's business risks and entity-level controls as well as to the assessment of the impact of client's business risks and entity-level controls on audit risk. The majority of behavioral accounting studies in judgment performance have chosen either an experiment or a survey design (Brownell and Trotman, 1988, p.331). This empirical study does not take surveys into consideration but uses instead experiments. Brownell and Trotman (1988, p.332) suggest that "true experiments are the most appropriate means of scientific inquiry which permit the researcher to confidently conclude 'this caused that to happen'. "True" experiments, making use of random assignment of experimental subjects to experimental treatments, provide the ability to make causal inferences. Some other advantages of experiments are (as opposed to for example case studies and archival studies):

- Participants in the experiment usually make judgments concerning the same cues, and hence, the internal validity of judgment comparisons is enhanced. This is particularly important because of typical complexities and specificities in the audit client environment which makes it more difficult to generalize findings resulting from case studies.
- Participants generally make judgments within the same time frame. Judgment differences as a result of observations at different points in time need not be considered.
- In an experiment the confounding factors can be excluded making the research design more controllable.

An important disadvantage of experiments compared to other types of studies is the decreased external validity, "the generalizability of experimental findings to the "real" world" (Babbie, 1995, p.245). In addition, internal validity needs specific consideration when constructing the research design. In order to deal with both validity types the research design has been carefully constructed, for example, (1) the case-setting used in the questionnaire has been pre-tested before it was distributed to participants, (2) measurement of participant's judgment performance – as measured by accuracy – in the first experiment and selection of cues in the second experiment was designed making use of expert panel's judgment's. Other design considerations will be discussed hereafter in the following sections (see for example section 3.3.6).

For each of the two distinguished audit tasks (the identification task and assessment task respectively) this study constructed an experiment.

Experiment

The first experiment is concerned with the auditors' judgment performance in an identification task of *client's business risks and client's entity-level controls*. Bonner (1990) examined the role of task-specific knowledge on the auditors' judgment performance with respect to an identification task. She conducted a 2*2 between-subjects experiment by varying both the level of experience (experienced-inexperienced) and the task (control risk assessment - analytical procedure risk assessment). Participants were provided with a pre-defined list of risk-factors which were either a relevant or an irrelevant cue to the decisions to be made. This setting, however, does not accurately measure the auditors' recall capabilities as participants are provided with a pre-defined list of risk factors. The empirical study presented in this thesis makes use of a free - not pre-defined - format for the identification (recall) of client's business risks in a hypothetical case-setting. Hence, participants are not randomly assigned to different treatments.

The second experiment is concerned with the auditors' judgment performance in an assessment task, assessing the impact of client's business risks and client's entity-level controls on audit risk). Of primary interest in this assessment task is the auditor's judgment performance as measured by a consensus variable. The majority of existing consensus studies has used an experiment design in audit risk assessment task (e.g., Ashton, 1973; Ashton, 1985; Meixner and Welker, 1988; Bonner 1990).

Both experiments were contained in one questionnaire. For each Big4 audit firm, a firm representative was selected. Each Big4 audit firm representative (partner at the firm's technical department) received 30 questionnaires. The representative sent the questionnaires to selected participants. Firm representatives were specifically requested to select participants of the level of audit manager and to equally distribute the questionnaire to audit managers with a high level of industry-specific experience in the construction industry and to audit managers without such experience. The objective of this procedure intermediation of technical departments was twofold:

1. Technical departments have an authoritative position within the audit firm. Hence, involvement of the technical departments contributed to timely responses and a high response rate.

2. The technical partners were provided with criteria regarding the selection of participants. Without their intervention and helpfulness it would not have been possible to select both industry-specific auditors and non-industry-specific auditors. This selection criterion is related to one of the independent variables (namely, the level of industry-specific experience) and, hence, was of crucial importance for getting a usable dataset.

Both experiments are concerned with the auditors' judgment performance. Examination of the auditors' judgment performance is often a difficult task since in many cases no objective performance criterion is available (e.g., Wright, 1988; Bonner 1990). For that reason the auditors' judgment performance in the second experiment (assessing the impact of client's business risks and entity-level controls on audit risk assessment) will be measured by a consensus variable. Given the absence of an external accuracy criterion, the consensus variable is the best possible way of measuring judgment performance in this task. With respect to the client's business risk and client's entity-level control identification task, a judgment performance criterion (accuracy) has been developed (see for example Asare and Wright, 1995). An expert panel has been composed in order to develop this external performance criterion. A second objective of the expert panel is to improve the external validity of the experiment design, particularly with respect to the second experiment in the selection of cues representing real world settings. The expert panel – as a research method – will be described in the following section. The way in which the external performance criterion has been developed will be illustrated in section 3.3.1.

Expert panel

Relatively little research has been performed concerning the business risk audit approach as a whole or specific audit tasks of this approach in particular (O'Donnell *et al.,* working paper, 2004). Lemon *et al.* (2000) concluded that large audit firms had implemented comparable, minor exceptions left aside, (business risk-based) audit methodologies in the nineties of the previous century[7]. Given the relative novelty of these audit approaches, no standardized case descriptions of specific industries existed

[7] Exceptions concern, amongst others: (1) whether inherent and control risks are separately assessed or combined, (2) the use of tools (checklists, computer aids, etcetera) can differ, and (3) the objectives of implementation can differ (e.g. marketing-objectives, audit quality objectives, added-value objectives etcetera).

at the time of the current empirical study[8]. We have developed a case description of a construction company which has been pilot tested. From existing literature on behavioral accounting research, a distinction has been made between expert, experienced, and novice auditors (e.g., Wright, 1988). Wright (1988) stated that "the judgment formulation process (information search, lines of reasoning, number of hypotheses generated and considered) may be different" for these distinguished categories of auditors. In sum, experts (as compared to novices) have organized their knowledge in integrated schemata and as a result have meaningful information readily available in their mindset. Expert auditors - in general - show higher levels of judgment performance compared to less experienced or novice auditors. In this empirical study, an expert panel is used as a construct to benchmark the respondent's judgment performance in the experiment. Specifically, the expert panel's assessments will be used to calculate accuracy (i.e., judgment performance) scores of experiment participants.

By analogy with existing literature (e.g., Solomon *et al.*, 1999), the following conditions have been established in this thesis in order to make sure that the panel would consist of auditors with high-level task-specific experience:

- The experts are *junior audit partners* in a *Big4 audit firm*. Solomon *et al.* (1999) used *senior partners* as condition to qualify as an expert. The level 'partner' has been used in this thesis to contrast with the experiment participants' level 'manager' since partners are assumed to have more business knowledge compared to managers. Hence, partners' judgment and decision-making might serve as best possible benchmark. The condition '*junior* partner' should ensure that the expert panel members are heavily involved in the audit team, including involvement with risk identification and risk assessment tasks. Within Big4 audit firms two partner roles are distinguished: lead or coordinating partners and concurring partners. In many cases, the lead partner role is performed by a senior partner, who has – in addition to the role of coordinating the audit – a specific role in developing and sustaining a good relationship with client management and others involved like the Supervisory Board and General Meeting of Shareholders. The role of the concurring partners which can be performed by both senior and junior partners is to bear responsibility for the quality of the audit. In this role, these partners are heavily involved in conducting the audits including getting all audit and accounting issues timely solved.

[8] In the recent past, more standardized case descriptions have in the meantime been developed. Refer, for example, to the Business Measurement Case Development and Research Program, www.business.uiuc.edu/kpmg-uiuccases.

- The expert is *business leader* in the industry under consideration, i.e. the construction industry. The objective of the criterion is to ensure that the expert both has an overview of and steers developments within a certain industry (e.g., developments in regulatory environment, accounting policies, audit approaches and training programs). Solomon *et al*. (1999) used *membership of AICPA industry committees* as a condition, which is similar by nature.

Big4 audit firms were requested to assign one firm representative to the expert panel based on the conditions above.

An expert panel meeting has been arranged, which took place in 2003. The materials used in the expert panel meeting have been pilot-tested by seven experienced auditors and researchers. The expert panel instrument has been included in the appendices of this thesis.

This section has discussed the most important elements of the research methods of the empirical study. Section 3.3 deals with the selection of elements of the research sample.

3.3 Description of research sample

Subsequently the following elements of the research sample will be described:
- Audit tasks;
- Participants;
- Selection of industry;
- Selection of financial statement account;
- Client's business risks and entity-level controls selected in the second experiment (assessment task);
- Internal validity.

3.3.1 Audit tasks

In Section 2.2.1, it was described that the business risk audit approach encompassed two elements which are more prominently present in this approach compared to the traditional audit approach (Bell *et al.*, 1997; Bell *et al.*, 2005):

1 The business risk audit approach has a focus on *understanding the client's business* including an assessment of the client's business viability and profitability.

Based on this understanding, the auditor develops “knowledge-laden hypotheses”, hypotheses stating what the auditor expects to see in the financial statements in terms of, for example, development in financial results of the client’s company versus competitors.

2 The business risk audit approach is a *holistic, top down approach* which is based on the argument that although individual financial statements may be valid, the entity as a whole might not be viable (and hence the consolidated financial statements) due to complex interdependencies within the firm.

Key issues in the selection of audit tasks are:

- From existing research literature on behavioral accounting (e.g., Tan and Libby, 1997) it follows that auditors show differences in task-specific knowledge. Hence, the audit tasks to be included in the experiment need to be as specific as possible in order to be able to detect which knowledge differences attribute to differences in judgment performance.
- Although the two elements of the business risk audit approach are not entirely new, these elements at least mark a deviation from the traditional financial statement audit since a serious attempt has been undertaken to provide field auditors with guidance in applying concepts like ‘understanding the client’s business’ (Bell *et al.,* 1997). We have developed research questions in Chapter 2 relating to the business risk audit approach. Particularly in this thesis, the quality of the auditors’ judgment performance with respect to the identification of client’s business risks and entity-level controls as well as assessing the impact of these risks and controls on audit risks will be examined.

Audit tasks selected in the experiment

Based on these key issues, the following audit tasks have been selected for the experiments:

- Identification of the (most important) client’s business risks for the hypothetical client setting; this task is part of the audit procedures with respect to ‘understanding the client’s business’.
- Identification of the (most important) client’s entity-level controls deemed most appropriate in mitigating the identified client’s business risks; this task has been selected as it constitutes the major element of applying a holistic approach in the financial statement audit.

- Assessing the impact of two specific client's business risks and two specific client's entity-level controls on the level of audit risk; this task follows the previously described audit tasks. Errors in judgment performance related to the identification of client's business risks and client's entity-level controls potentially result in judgment errors in assessing audit risk. It is thus of interest to include this task also in the experiment.

The first two tasks are identification tasks in a free format. Behavioral studies of audit risk (e.g., Colbert, 1988; Bonner, 1990) typically make use of formats containing client risk factors presented by the researcher to the participant (Bedard and Graham, 2002). Bedard and Graham argue that 'these studies bypass the difficult step of risk identification, in which an auditor must draw specific facts from a large knowledge base of client and industry data acquired in the field'. The identification of client's business risks is crucial to understanding the client's business. The last two tasks are assessment tasks, which imply that risk and control cues are given and the auditor will be asked to assess their impact on audit risk. Hence, in these assessment tasks the focus shifts from *understanding the client's business* to the (impact of client's risks and controls on the) *financial statements*.

Task content of experiments

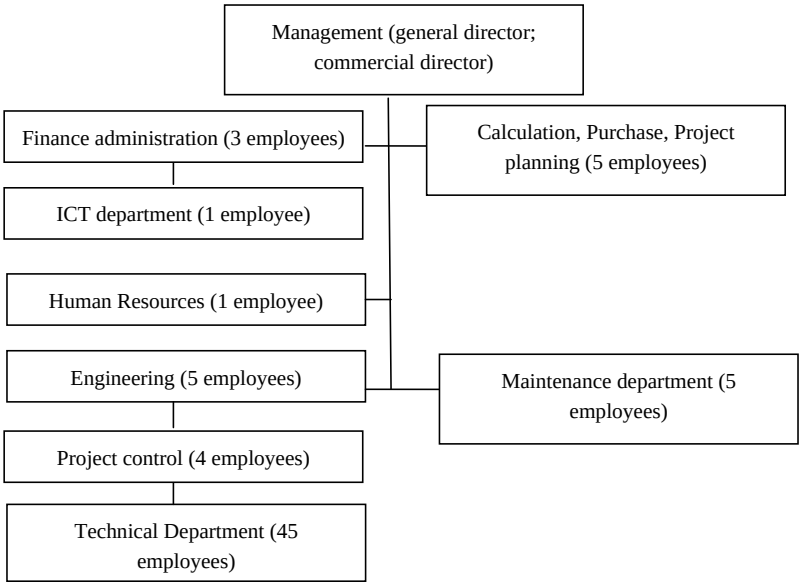
For all audit tasks selected in the experiment, participants were provided with the following case-description of a hypothetical audit client.

Case introduction

Since ten years you have been engaged to the financial statement audit of construction company ABC. Currently, it is April 1, 2002. In the near future, the interim (process) audit will start and now you are preparing this audit by considering the most important points of attention relevant to the audit. Until now, you have conducted a systems-based audit approach, based upon risk assessments. You have always been able to provide an unqualified audit opinion, without notable discussion issues in the discussion meeting with client management. As a result, you have always delivered a short-sized management letter.

Organization chart of construction company ABC

Construction company ABC B.V. is a medium-sized construction company, with operations in the centre of The Netherlands, and executes primarily regular projects in the segments ‘civil constructions’ and ‘commercial/industrial buildings’. In 2001 revenues were generated of approximately € 50 million with a positive net result of € 1 million (2%). In recent years, both revenues and net result were consolidated at the current levels. Construction company ABC has organized the firm as follows:



Objectives and strategy of the company

Construction company ABC B.V. was founded 40 years ago by the father of the current general director. Since then, the company has gradually expanded to her current size. Formalized objectives and strategies have never been put on paper. At local billboards the company regularly advertised with the slogan ‘ABC aims for the lowest costs’. The founder’s device was always: ‘we perform those activities where we have always excelled in’. The commercial director regularly gets into contact with the five most important principals in the region.

Projects

Projects are characterized by serial production. Projects are regularly executed with fixed fee contracts. The duration of the projects is two years at a maximum.

Processes
Having received a request for proposal the Calculation department prepares the calculation, which is based on the project specifications. This calculation takes into account a premium of 1% with respect to general risks (this percentage is based on experience). After being engaged by the principal the calculations are further specified, the project is planned, a project-number is opened in the project-administration and the contract is prepared.

Based on the detailed project forecast the Purchase Department enters into contracts with suppliers (materials) and with sub-contractors.

The forecasted and realized costs and revenues are recorded in the project-administration which is part of the finance administration. The costs include direct labor hours and all directly attributable travel and accommodation expenses of the employees (base don weekly timesheets). Recorded hour rates are task- and function dependent and are based on the yearly forecasts of the company. All materials used are recorded on specific project-engagement numbers by employees of the finance department.

Deviations of original contract
Contract-variations are executed after oral assignment by the principal. Only in cases where the contract-deviations are substantial a new project-forecast is prepared. Because of his frequent contacts with the principal and project-managers the general director is rapidly informed on specific developments regarding the projects in execution.

Project funding
Results realized in the past have annually been passed to private accounts of the company's founder. From the time of the sale of the company from the founder to his son some years ago, the current general director has aimed to raise the company's capital to a required minimum level. As can be seen from the Appendix (financial information) this objective has reasonably been realized in the meantime.

Safety and environmental issues
Construction company ABC strives for good working condition regarding her employees and complies with all relevant rules and regulations with respect healthiness, safety and environmental conditions. Illness percentages are low and in recent years no specific accidents occurred.

ICT
The level of computerization is low.

Management information
Periodically a financial overview per project is being composed based on calculations, receipts of goods received, time-sheets and production reports. The financial overview contains a comparison between forecasted and realized costs per project phase (which takes into account the contract deviations) and also shows the invoiced installments. In addition, the general director periodically receives an overview of the realized general costs (compared to the budgeted costs). The general director only consults the manager of the Finance department only in case this overview shows striking deviations between forecast and realization. The commercial director himself is responsible for regularly contacting the principals and regularly visits projects in execution.

Financial information construction company ABC B.V.

Balance sheet as at December 31
(* € 1,000)

	Forecast December 31, 2002		December 31, 2001	
Fixed assets				
Tangible fixed assets		500		500
Current assets				
Equipment	400		350	
Work in Progress	10,000		8,300	
Trade receivables	100		100	
Other current assets	50		250	
		10,550		9,000
Cash and cash equivalents		450		500
Total assets		11,500		10,000
Equity		8,000		7,000
Provisions		1,500		1,500
Long-term liabilities		1,000		900
Current liabilities		1,000		600
Total liabilities		11,500		10,000

Profit and loss
(* € 1,000)

	Forecast 2002	2001	2002	2001
	€	€	%	%
Revenues				
Net revenues	48,000	48,900	96.00%	97.80%
Change WIP	1,700	1,000	3.40%	2.00%
Other revenues	300	100	0.60%	0.20%
	50,000	50,000	100.00%	100.00%
Costs				
Costs of materials	41,000	41,210	82.00%	82.40%
Salaries	3,940	3,700	7.90%	7.40%
Depreciation fixed assets	100	100	0.20%	0.20%
Other costs	3,360	3,400	6.70%	6.80%
	48,400	48,410	96.80%	96.80%
	1,600	1,590	3.20%	3.20%
Financing expenses	-60	-50	-0.10%	-0.10%
Pre-tax income	1,540	1,540	3.10%	3.10%
Tax	-540	-540	-1.10%	-1.10%
Net result	1,000	1,000	2.00%	2.00%

Participants, having read the case-description were subsequently requested to perform the audit tasks selected in the experiment.

Task content 'Identification of client's business risks'

The participants were first requested to identify the five most important and appropriate client's business risks based on the case-description. The task was limited to a maximum number of five client's business risks. This limitation comes close to real-world settings in the sense that the auditors' list of identified business risks typically ends up in a list of significant business risks which require specific consideration in the financial statement audit (ISA 315, section 108, p 25). This is also in conformity with ISA 315, section 31 (IFAC, 2003), which states that the auditor does not have responsibility to the identification of *all* business risks. Limiting the number of business risks to be identified to the *most important* ones is assumed to result in an appropriate measure of judgment performance. It can be argued that participants - identifying a number of five *appropriate* business risks - would show higher judgment performance compared to participants with less than five *appropriate* business risks (showing the latter participants obviously would have overseen an important business risk). 'Appropriate' means in the context of this empirical study: 'in conformity with the expert panel's list of the most important client's business risks." The task content of the expert panel meeting is first described before the description of the task content of the experiment will be continued.

Task content of the expert panel's meeting

The expert panel meeting took place in 2003. Prior to the expert panel's meeting, the experts (business leaders of the construction industry within Big4 audit firms) received a confirmation letter, in which the experts were asked not to talk with their audit colleagues about the content of the expert's meeting. This procedure was performed to ensure that participants in the experiment (which might be colleagues of the experts) did not have any pre-knowledge of the experiment. The expert panel was intended to meet once in a meeting of approximately two hours. After a short introduction by the researcher (approximately five minutes), the experts were provided with a case-description of a construction company. The experts were given ten minutes to read the case-description. Thereafter, the experts were provided with the following tasks (the experts were told that

all tasks to be conducted, were related to the audit of the industry-specific financial statement account 'Work in Progress'):

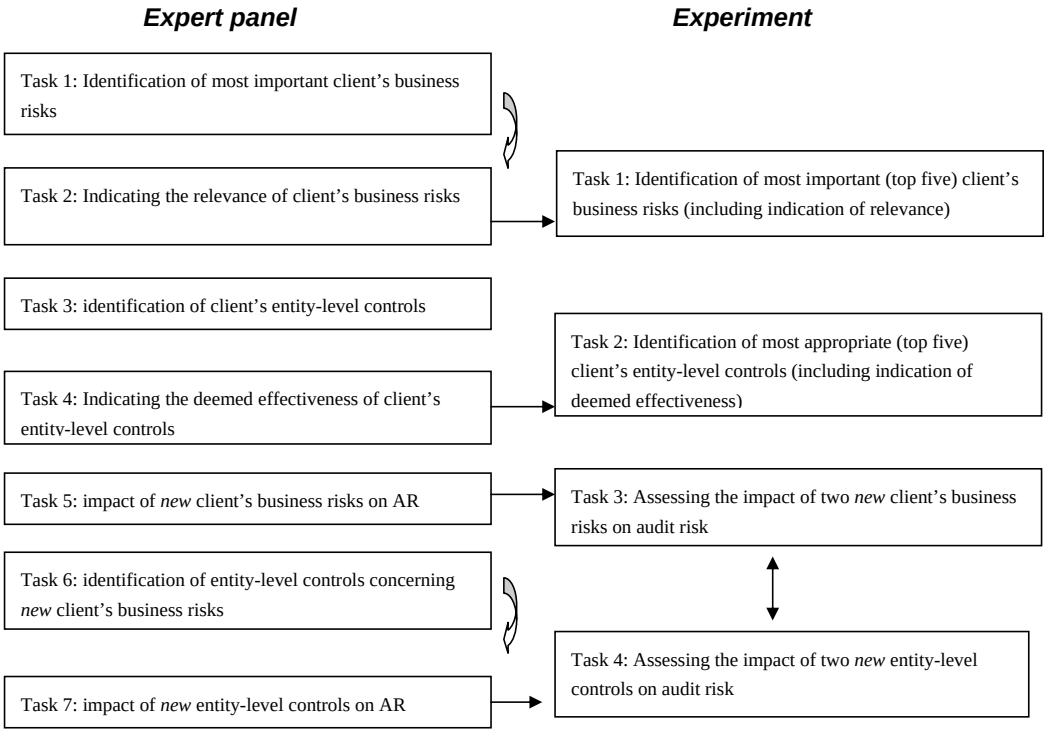
1. *Identification of business risk factors present in the case-description*. From this task, the researcher composed a total list of identified business risk factors by all experts to be used in the next task.
2. *Indicating the relevance of identified business risk factors*. The experts were asked to distribute 100 points of importance over the identified business risk factors.
3. *Identification of seemingly most effective entity-level controls*. To complete this task the experts were (again) provided with the total list of identified business risk factors and were asked to identify those client's entity-level controls that were deemed to most effectively mitigate the identified business risks.
4. *Indicating the deemed effectiveness of the identified entity-level controls*. The experts were asked to distribute 100 points of effectiveness over the identified entity-wide controls.
5. *Assessment of the impact on audit risk* (of the financial statement account 'Work in Progress') *due to new occurred business risk factors*. To complete this task, the experts were provided with a list of new events/business risk factors in addition to the case-description[9] [10] and were asked to assess the impact of each of these business risk factors on audit risk individually.
6. *Identification of seemingly most effective entity-level controls due to the new occurred business risk factors.* To complete this task the experts were (again) provided with a list of the new occurred events/business risk factors and were asked to identify those client's entity-level controls that were deemed to most effectively mitigate the business risks.
7. *Assessment of the impact on audit risk* (of the financial statement account 'Work in Progress') *due to (new) identified entity-level controls*. To complete this task, the experts were provided with a list of the identified entity-level controls resulting from task 6 and were asked to assess the impact of each of the identified entity-level controls on audit risk.

[9] The decision to introduce new business risk factors (in addition to the case-description) is motivated by potential knowledge-spillovers which could occur in the experiment. Having identified business risk factors, the subjects in the experiment have to assess the impact on audit risk due to the occurrence of business risks. This assessment could be confounded by information elements of the case-description. The introduction of new business risks will mitigate the risk of knowledge-spillover to some extent.

[10] The content of this list of new events/business risk factors is based upon literature review (e.g., Vaassen, 2002; Kerst, 1997).

The coherence of the content of the expert panel's tasks with the experimental tasks is visualized in Figure 3.2:

Figure 3.2 Coherence of tasks Expert panel and Experiment



The expert panel's output of task one to four is to serve as benchmark in the calculation of the accuracy-variables in the experiment related to the identification tasks. The expert panel's output of tasks five and seven has been used to make a selection of two client's business risks and two entity-level controls to be included in the assessment task (in Figure 3.2 presented as Task 3 and 4 of the Experiment). The selection of two risks and two controls will be further described in section 3.3.5.

Experts, after having completed the seven tasks, were asked to complete a debriefing questionnaire to ensure that both the case-description and the task content were clearly

understood. From this debriefing questionnaire no specific remarks for further consideration were provided by the experts.

The used materials during the expert panel's meeting are presented in Appendix A of this empirical study.

Task content of the experiment

Participants having identified the five most important client business risks were subsequently asked to distribute 100 points over the five identified business risk in order to assess the level of importance (from the perspective of the client's business operations) of each of the risks.

Business risk	**Relevance assessment**
1.	
2.	
3.	
4.	
5.	
	Sum = 100

This sub-task was constructed in order to assist the development of an additional measure of judgment performance. This judgment performance shows the number of client's business risks identified by a participant that match with client's business risks identified by the expert panel.

Consider the following possible outcome related to the first sub-task. Assume a participant had identified a number of three appropriate business risks (hence, missing two relevant business risks). In addition, assume that the participant applied most of the importance assessments to the three appropriate business risks and relatively less importance weight to the two less important business risks. In this situation, the participant would - related to the first sub-task - show a medium level of judgment performance. Consider on the other hand another possible outcome. A participant identifies four (out of five) appropriate business risks, but – let us assume – attached a high importance weight of 80 points to the 'non-appropriate' business risk. This latter case would result in a relatively lower level of judgment performance compared to the other participant with a medium level of judgment performance. Hence, the second sub-

task provides us with an additional measure of judgment performance which sheds light on the level of importance the participant attributed to the identified business risks.

Task content 'Identification of client's entity-level controls'

The task-structure of the task 'Identification of client's entity-level controls' is similar to the previously described task content related to the task 'Identification of client's business risks'. Participants were requested to identify the five most appropriate entity-level controls in mitigating the client's business risks. The case-description did not provide a detailed list of internal control procedures. The participant, hence, needed to recall which of the entity-level control mechanisms had been effective – taking into consideration client-settings with similar risk-profiles and taking into consideration the theoretical knowledge framework developed during education and training – in mitigating business risks.

In addition, the participants were asked to distribute 100 points of 'perceived effectiveness' over the five entity-level controls in mitigating the client's business risks. These sub-tasks – in conformity with the sub-tasks related to the identification of client's business risks - resulted in two measures of judgment performance. The first judgment performance measure is related to the conformity of the participants' list of entity-level controls with the expert panel's list of entity-level controls. The second judgment performance measure is related to the conformity of the participants' relevance assessments regarding the identified client's entity-level controls with the expert panel's relevance weights.

Task content 'assessing the impact of client's business risks and client's entity-level controls on audit risk'

The third and final audit task in the experiment relates to assessing the impact of client's business risks and client's entity-level controls on the level of audit risk of a certain financial statement account (see Section 3.3.4). This task encompassed a number of four pre-defined cues (two business risks and two entity-level controls):

- The financial condition of the company strongly deteriorated (CBR1).
- The company's strategic focus changed from "low-cost homes" to "luxury villas" (CBR2).

- Strengthened project-control by progress reports on Work in Progress (ELC1).
- More specialized personnel assigned to projects (ELC2).

These four cues were presented to the participant in all possible combinations of presence (2^4 design) except for the possible combination of 'zero cues present. Hence, each participant was provided with 15 individual cases, each of the cases representing a new client case-setting with varying cue combinations present. The participants were requested to assess for all cases the impact on audit risk. Audit risk has been defined in the experiment as the level of risk of material misstatement related to a certain financial statement account. Audit risk is a function of inherent risk and control risk (these two risks need to be assessed by the auditor individually or combined) as well as detection risk (this risk is a result of an acceptable level of audit risk and the assessment of inherent and control risk). In the research questionnaire the participant was not requested to individually assess (the impact on) inherent risk and control risk, but was instead requested to perform a combined risk impact assessment of inherent risk and control risk together. This closely connects to the ordinary audit practice as described in ISA 200 "Objective and General Principles Governing and Audit of Financial Statements" (Section 21, 2003).

In section 3.4 the related dependent variables to this task will be discussed, including methodological aspects of modeling judgment performance. In the next section, the second element of the research sample – experiment participants – will be discussed.

3.3.2 Participants

Target group – organizational level

The research questions of this empirical study are directed towards the auditors' judgment performance with respect to the audit tasks as described in section 3.3.1. International Standards on Auditing related to these audit tasks (e.g., ISAs 200, 315, and 330) describe the audit risk task from the perspective of an individual auditor conducting this task. However, ISA 315 (Section 14 and following, 2003) states that "the members of the engagement team should discuss the susceptibility of the entity's financial statements to material misstatements". From this standard, it is not exactly clear what level of the team members actually performs the identification of client's business risk and controls as well as the impact assessment of these business risks and controls on audit risk. From ISA 315 (Sections 16 and 17) it follows that higher levels (including audit partners) are likely to be involved in the engagement team discussion because of their

roles, knowledge and experience. Libby and Tan (1997) argue that from the level of audit manager upward, the required knowledge focus shifts from technical knowledge to managerial knowledge. As auditors promote to a managerial level, inter-personal skills for example gain in importance. The conduct of the audit tasks selected in the experiments (see 4.3.1) imply that the auditor will have in real life settings discussions with client management in order to gain an understanding of the client's business (Bell *et al*., 1997, p.13). Eilifsen *et al.* (2001) also expected that the transition of the traditional audit approach to the business risk audit approach would be accompanied with a shift in the composition of the audit team from less experienced to more experienced auditors. Identification of business risk and client's response to those risks will regularly be performed by client's management level (ISA 315, Section 33, 2003). Both from a client perspective (highest management is involved in risk management) and from an auditors' skills perspective we conclude that the level of 'audit manager' will be involved in the tasks selected in the experiment. Hence, our experimental subjects come from this level.

The 'audit manager' is also of interest from the 'experience'-related behavioral accounting studies. Until approximately 1988 (e.g., Wright 1988) most of these studies concluded that general experience did not positively contribute to judgment performance. These studies, however, mainly examined general experience related junior and senior staff auditors. After 1988, higher levels have become more and more included in research studies (examples are Bonner and Lewis, 1990; Tan and Libby, 1997). Bonner *et al.* (1990), for example, concluded that general experience positively influenced judgment performance. Therefore, it is of interest to examine what the impact of general experience for higher experience levels is on judgment performance in relatively new audit tasks. In order to investigate the impact of general experience on the auditors' judgment performance a second subjects group was selected. This additional group consisted of post-graduate auditing students. Auditors' judgment performance is a function of knowledge, experience and skills (Libby, 1995) which develop on a learning curve during an auditors' career. Following this 'expertise paradigm' auditing students are referred to as "novices", audit managers are referred to as "experienced" and the members of the expert panel as "experts".

Selection of subjects

Distribution procedure

In sum 120 questionnaires were sent to the Big4 audit firm representatives (each firm representative received 30 questionnaires). The firm representatives were requested to

compose a group of audit managers within their firm ensuring that approximately 15 of the questionnaires were completed by audit managers designated to the construction industry (see Section 3.3.3) and that another 15 questionnaires were completed by audit managers not designated to that industry. Most Big4 audit firms did not appear to have a separate department related to this industry but instead were 'virtually' organized with shared knowledge databases. In addition, cooperation of the Big4 audit firms with this empirical study was agreed under the condition that the results would be anonymously (without explicit reference to individual participants or individual firms) presented. As a result of these circumstances the participants were not randomly assigned to the experiments. All respondents were requested to complete the entire questionnaire. The questionnaire did not contain a between-subject manipulation. Audit firm representatives were also requested to monitor the timely response of the participants.

Instruction-set
In the instruction-set - to which the research questionnaire was attached – the participants were requested not to make use of any decision-aids and also not to discuss the questionnaire with colleagues. The focus of this empirical study is on individual auditor's judgment performance (i.e., not on group judgment performance). The instruction-set additionally contained generally accepted definitions of key words used in the empirical study.

The described distribution procedure resulted in 85 usable questionnaires which equals a response rate of 70.83% which satisfies the requirements for further analysis of the data-set as received from the questionnaires.

Group of auditing students
Data-collection with respect to the target group of auditing students took place during two (post-graduate) education sessions at the university resulting in 20 usable questionnaires. This group of auditing students has been selected as it is assumed that they would have some experience in the auditing field. From the debriefing questionnaire a mean of 2.85 years of general experience in the auditing field was reported. Auditing students received the same instruction-set as audit managers received. During the session, the teacher monitored that students did not discuss with each other and did not make use of any decision-aids.

In Section 3.3.3, the third element of the research sample will be discussed, the selection of a specific industry.

3.3.3 Selection of industry

In the design of the research sample, one specific industry has been selected. This design choice stems from the research question (refer to Chapter 2) 'whether, and if so to what extent, the auditors' judgment performance is influenced by the level of industry-specific experience'.

The construction industry has been selected for incorporation in the research design of the current empirical study. Among the reasons for selecting this specific industry are the following:

- I was familiar with this industry while I previously had some construction audit engagements in my engagement portfolio when working as an independent auditor. This implied an advantage in developing a case description related to this industry.
- The construction industry has not been examined previously in the context of the current empirical study. The current study hence fills a gap in existing research studies.
- The construction industry is – compared to the more extensively studied industries like Financial Services and Healthcare (e.g., Solomon *et al.,* 1999), financial services (e.g. Taylor, 2000; Solomon *et al.,* 1999) – less regulated, and the industry-service lines of the Big4 audit firms in the Netherlands are less well developed[11]. It is therefore of interest to examine whether industry-experience in the construction industry would contribute to the auditor's judgment performance.

The next sub-section (3.3.4) is concerned with the selection of a specific financial statement account for the experiment.

3.3.4 Selection of a specific financial statement account for the experiment

The selection of a specific financial statement account is related with the experiment task 'assessing the impact of client's business risks and client's entity-level controls on audit risk'. International Standards on Auditing (e.g. ISA 200, Section 18 and 19, IFAC,

[11] During individual interviews with expert panel members, panelists indicated, for example, that knowledge databases (including the development of industry-specific risk templates) were being developed at that point in time. In addition, they indicated that the industry line actually was a 'virtual' industry line since auditors designated to this industry were not physically located in one department on one or more locations, but for example, were located in the general audit practice department.

2003) require that the auditor considers the risk of material misstatement at various levels: the overall financial statement level, but also at the class of transactions, account/assertion balance, and disclosure level. This empirical study is concerned with audit risk assessment at the account level which is not unusual in research studies on audit risk assessments (e.g. Waller, 1993, states that auditors make use of the "most dominant assertion heuristic" when assessing audit risk at account level). We have selected the specific account Work in Progress (WIP) (instead of audit risks related to the financial statements as a whole or related to disclosures) which represents the heart of the business of the construction industry where the significant flows of transactions are recorded and which involves significant judgment of both the company's management and the auditor. WIP consists of three components: costs plus profit surcharge (debit), invoiced installments (credit) and foreseeable losses (credit). WIP hence comprehends the major business processes through which the business-specific transactions flow.

The following two sub-sections are concerned with the selection of specific client's business risk factors and client's entity-level controls in the audit task 'assessing the impact of client's business risks and entity-levels controls on audit risk'.

3.3.5 Selection of client's business risks and client's entity-level controls in an assessment task

The first two audit tasks selected in the experiment relate to the identification of client's business risks and controls. With respect to the third audit task – assessing the impact of business risks and controls on audit risk – the selection of input cues to this decision needs separate consideration which is discussed hereafter.

Number of cues

In experimental settings comparable to this empirical study, the number of cues manipulated is regularly low (between four and six cues). At least two reasons are provided for this low number.

First of all, researchers need to decide on the number of cues in relationship with the design of the study since participant fatigue and/or boredom potentially influence the statistical results if too many cues are incorporated in the experiment design. Principally, a decision is necessary as to use a full or a fractional factorial design. In a full factorial

design, all cues selected for the experiment are presented to the participant in all possible cue combinations. In a fractional factorial design, all cues selected for the experiment are presented to the participant in a sub-set of possible cue combinations. For example, a full factorial design with 6 cues (present/absent) result in 64 possible cases of cue combinations which would probably result in fatigue or boredom as all cases need to be assessed individually. A half fractional factorial design would in the given example result in 32 case combinations which are presented to a participant. Making use of a fractional factorial design requires careful consideration of the researcher to which of the possible cue combinations are excluded and which are included in the experiment. A fractional factorial design is hence, somewhat more complicated compared to the full factorial designs. In this thesis, a full factorial design has been selected for reasons of straightforwardness (i.e., this implies a less complex design and given the low number of cues included in the design will potentially overcome participants' fatigue and boredom).
Secondly, people in general appear to show bounded rationality in judgment and decision-making tasks (e.g. Cooksey, 1995; Solomon *et al.,* 1995). This implies that for a single decision, people – whether they are experienced or not regarding the task at hand – consider only a limited number of cues which have impact on their decision.

In this empirical study, both business risks and entity-level controls are part of the selected cues. Prior studies related to audit risk decisions or studies related to the business risk audit approach, did not take these both categories of cues into account. In this regard, this thesis contributes to existing audit research literature. The full factorial design consists of four cues, of which two are related to business risks and two are related to entity-level controls.

Nature of cues

The decision with respect to including specific business risks and entity-level controls in the experiment is made in relationship with the research questions.
First, one of the research questions is concerned with the impact of industry-specific experience on the auditors' judgment performance. As will be described in the sections 3.4 and 3.5, it will be investigated whether (and if so, to what extent) industry-specific experience influences the auditors' judgment performance with respect to the impact of an industry-specific cue on audit risk, as well as the auditors' judgment performance with respect to the impact of a not-industry-specific cue on audit risk. In other words, do industry-specialized auditors make different judgments – compared to non-specialists – with respect to all cues or with respect to only industry-specific cues? As a result of this

consideration, for both client's business risks and entity-level controls a general and an industry-specific cue have been selected.

In order to select industry-specific cues for the factorial design, expert panel members were asked to indicate on a list of risk and control cues which of those risks and controls was industry-specific. For this list of risk and control cues, expert panel members were additionally requested to assess the individual impact of each of these cues on audit risk. In deciding on which risk and control cues to include in the experiment, the standard deviation of the panel members' assessments has been considered. In addition, we have considered prior research studies related to financial statement risks.

Table 3.1 presents the cues which have been selected for the experiment in a full factorial design.

Table 3.1 Selection of cues in experiment (assessment) audit task

Code	**Description**	**Industry-specific**	**Expert panel's SD**[12]
CBR1	The financial condition of the company strongly deteriorated.	X	2.22
CBR2	The company's strategic focus changed from "low-cost homes" to "luxury villas".	√	2.58
ELC1	Strengthened project-control by progress reports on Work in Progress.	√	2.99
ELC2	More specialized personnel assigned to projects.	X	1.91

Where CBR = Client's Business Risk
And ELC = Entity-Level Control
SD = Standard Deviation

The selection of CBR1 (the financial condition of the company strongly deteriorated) was specifically based on prior research literature (e.g., Pratt and Stice, 1994). This business risk is found as one of the most important risks which probably can result in a material misstatement. For example, when the financial conditions of a company are bad, the company's rating (if it is listed) or the relationship with the financial institutions will deteriorate, which in turn puts pressure on the company's management to manage

[12] Expert panelists were asked to assess the impact of a list of individual client's business risks and client's entity-level controls on audit risk. The scale used to measure this impact ranges from -10 (maximum negative impact on audit risk, i.e. decreased audit risk) to +10 (maximum positive impact on audit risk, i.e. increased audit risk).

earnings. CBR1, hence, applies to all financial statement accounts (and disclosures), whereas CBR2, ELC1, and ELC2 are related to single accounts (most importantly Work in Progress). CBR2 and ELC1 were selected because they were classified by the expert panelists as “industry-specific”. ELC2 was selected based on the relatively low standard deviation as calculated on the effectiveness assessments of the expert panelists. This implied that – compared to other entity-level controls – panelists showed a relatively high consensus on ELC2. So, it can reasonably be expected that this cue is relatively stable.

3.3.6 Internal validity of research design

In this section, aspects of internal validity of the research design will be described for the experiments.

Identification tasks

Regarding the identification audit tasks selected in the first experiment, the combination of an expert panel and an experiment will positively contribute to the internal validity of the research design since the judgment performance measures (accuracy, see also section 3.4) are based on external experts performing the same audit task on the same case-description. A potential threat to the internal validity of the design is the free response format that has been used in the questionnaire regarding the accurate interpretation of the wordings the participants and the wordings the expert panel have used. The participants’ answers provided in the response format will be used for the calculation of a judgment performance measure. The judgment performance measure (see Section 4.4 for a more detailed discussion) implies an equality relationship between the expert panel’s list of both business risks and controls and the participant’s list of business risks and controls. The participants were requested to describe in short wordings the top five of client’s business risks. It is hence possible that one participant used a catchword that covered a broader area compared to other participants. E.g., a participant identified the control ‘segregation of duties’ where other participants specified segregation of duties along departments/functions. For the purpose of mitigating this threat to a certain extent, I have prepared the ‘mapping’ of participant’s responses to the expert panel list as well as the underlying accuracy calculations. The entire mapping and calculation process was subsequently reviewed by and discussed with two other persons (an auditor of a Big4 audit firm and a member of the technical department of a Big4 audit firm and a researcher in auditing) resulting in a final accuracy scores. It was not possible to compute kappa’s measure of inter-rater reliability. Kappa’s measure

presumes equal values of the initial and final accuracy calculations. The dataset did not contain for all of the accuracy-measures equal values. Instead, 2-tailed Pearson correlations were computed, which are shown in the next table.

Table 3.2 Inter-rater Pearson correlations

	Acc1ini	**Acc1final**	**Acc2ini**	**Acc2final**	**Acc3ini**	**Acc3final**	**Acc4ini**	**Acc4final**
Acc1ini	1	.922* (p=.000)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Acc1final		1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Acc2ini			1	.865* (p=.000)	n.a.	n.a.	n.a.	n.a.
Acc2final				1	n.a.	n.a.	n.a.	n.a.
Acc3ini					1	.732* (p=.000)	n.a.	n.a.
Acc3final						1	n.a.	n.a.
Acc4ini							1	.866* (p=.000)
Acc4final								1

Table 3.2 shows that all inter-rater accuracy-measures to a high extent correlate significantly with each other.

A second internal validity issue relates to the limitation of the maximum number of five business risks and five entity-level controls the participants were requested to identify. Limiting the response format to five items implies that participants may identify risks or controls that – although these risks and controls do not match with the expert panel's list of risks and controls – are not simply wrong but only do not match with the *most important* risks and controls identified by the expert panel. This implies that judgment performance scores need to be cautiously interpreted. This issue is inherent to the design chosen.

Assessment task (assessing the impact of client's business risks and controls on audit risk)

Subsequently, the following issues concerning the internal validity of the research design will be discussed.

- Cue selection;
- Consistency of participant's response.

Cue selection

In section 3.3.5 the connection between the expert panel's tasks and the experiment has been described. The selection of cues in the experiment is based on various criteria, amongst which the requisite that the expert panel exhibits substantial agreement on the importance of those cues (see also Tan and Libby, 1997)[13]. As no other fully suitable external criterion was available beforehand, this procedure contributed to a certain extent to the internal validity of the experiment mode of observation.

Consistency of participant's response

Concerning the assessment tasks, a full factorial design is chosen. This implies that all selected cues are presented to the participants in all possible combinations (present: yes/no) resulting in 15 cases of cue combinations (excluding the combination of zero cues present). A threat to internal validity of this design is concerned with the potential impact of participants' fatigue or boredom ('demand effects') due to the lengthiness of the questionnaire and the relatively similar cases to be assessed. In order to mitigate this potential threat to internal validity to a certain extent, the design of the questionnaire included four elements:

- In addition to the 15 case combinations, participants were provided with four repeat cases. These cases replicated four cases included in the previously mentioned original fifteen cases of cue combinations. This procedure allowed for measuring stability[14] of the participants' responses (see also Colbert 1988; Cooksey, 1995);
- With the purpose of avoiding memory-carryover effects, all individual cases of cue combinations were presented on a separate page. In addition, participants were requested to complete the questionnaire subsequently completing page by page, and not to turn back to previous cases and participants' responses.
- Three versions of the questionnaire were developed in which different sequences of case combinations were presented to participants in order to counter-balance the order-effect.

[13] "Since the expert panel's responses were to serve as benchmarks it was crucial that items included in the final measure of tacit managerial knowledge exhibit substantial agreement among the partners" (Tan and Libby, 1997).

[14] Other studies (e.g., Ashton, 1973) included an additional measure of stability, namely the stability over time. This procedure involved performing the same experiment with the same participants at a different point in time. As this procedure doubles the resource capacity the Big4 audit firms would have made available to this empirical study, the before mentioned procedure has not been put into practice.

- The debriefing questionnaire contained a question relating to the level of self-insight asking the participants to provide the subjective assessment of individual cue impact.

The three sequences/versions were distributed over the group of audit managers as follows:

- Group 1: auditors with sequence 1 (n=31);
- Group 2: auditors with sequence 2 (n=30); and
- Group 3: auditors with sequence 3 (n=24).

Table 3.3 Sequence of cue presence

Cue presence	Sequence 1	Sequence 2	Sequence 3
1234	1	15	1
123	2	14	3
124	3	13	5
134	4	12	7
234	5	11	9
24	6	10	11
23	7	9	13
14	8	8	15
13	9	7	14
34	10	6	12
12	11	5	10
2	12	4	8
3	13	3	6
1	14	2	4
4	15	1	2

In this table, participants who completed “sequence 1” version of the questionnaire, first responded to the case setting in which all cues were present (“1234”), and subsequently responded to the case settings in which three cues were present (“123”, “124”, “134”, and “234”), and so on. Appendix B, tasks 5.1 to 5.15, is an example of sequence 1. Participants who completed “sequence 2” version of the questionnaire started with the case setting in only one cue was present (“4”, “1”, “3”, and “2”), and subsequently responded to case settings with two cues present, and so on. So, sequence 2 is the opposite sequence of sequence 1. Sequence 3 was a mixture of sequences 1 and 2.

Section 3.3 has described the elements of the research sample. The next section will discuss the dependent variables, measures of judgment performance.

3.4 Dependent variables

This section is concerned with the development of dependent variables, i.e. measures of the auditors' judgment performance. Related to the first experiment tasks (identifying client's business risks and identifying client's entity-level controls) four accuracy measures have been developed. The formula underlying the calculation of these accuracy measures includes the expert panel's response. For the purpose of understanding how the accuracy measures are derived from this expert panel, section 3.4 first describes the content of the expert panel's meeting as well as the relationship this panel meeting has with the research experiment tasks. Then, the accuracy measures will be described. The remainder of section 3.4 provides a description of the judgment performance measures related to the assessment task (assessing the impact of selected client's business risks and entity-level controls on audit risk). These performance measures are: consensus, self-insight, stability, and cue-usage.

Accuracy (identification tasks)

Figure 3.1 presented the dependent variables accuracy and consensus. Related to the identification tasks (identification of client's business risks and client's entity-level controls) accuracy has been selected as primary measure of judgment performance since an external criterion (expert panel meeting) is available. This section discusses how accuracy actually has been calculated.

For both identification tasks two distinguished accuracy variables have been developed:

- Factor accuracy, measuring the level of agreement between individual participants' identified client's business risks and controls and the expert panel's list of identified client's business risks and controls.
- Weighting accuracy, measuring the level of agreement between individual participants' importance (and appropriateness respectively) assessments relating to identified client's business risks and controls and the expert panel's importance (and appropriateness respectively) assessments.

This distinction resulted in four accuracy variables which are presented in table 3.4:

Table 3.4 Description of accuracy variables as measures of judgment performance

Measure	Task	Nature	Description
Accuracy1	Identification client's business risks	Factor accuracy	The level of agreement between individual participants' identified *client's business risks* and the expert panel's list of identified client's business risks
Accuracy2	Identification client's business risks	Weighting accuracy	The level of agreement between individual participants' assessed *level of importance* related to identified *client's business risks* and the expert panel's importance assessments.
Accuracy3	Identification client's entity-level controls	Factor accuracy	The level of agreement between individual participants' identified *client's entity-level controls* and the expert panel's list of identified client's entity-level controls
Accuracy4	Identification client's entity-level controls	Weighting accuracy	The level of agreement between individual participants' assessed *level of appropriateness* related to identified *client's entity-level controls* and the expert panel's appropriateness assessments.

Accuracy1

Accuracy1 measures the level of agreement between individual participants' identified client's business risks and the expert panel's list of identified client's business risks.

The four individual expert panelists were asked to identify the five most important client's business risks present in the hypothetical case-setting. This has resulted in a list of fifteen business risks (five identified client's business risks obviously described one and the same risk), and were hence excluded from the total list of client's business risks. Participants in the experiment were requested to identify the five most important client's business risks present in the hypothetical case-setting.

Accuracy1 is calculated as 'the number of client's business risks identified by a participant that match with the expert panel's list of client's business risks'.

Matching process
Recall from section 3.3.1 that in the identification task both expert panelists and participants were requested to provide a list of the five most important client's business risks and entity-level controls, i.e. they were requested to describe in their own words which client's business risks were present in the hypothetical case-setting. This implies that the used wordings of experiment participants in many cases did not fully match with the wordings used by the expert panelists, giving rise to semantic discussions. In order to ensure that the matching process was reliably performed, a proposal of this matching process for each individual participant was prepared. Thereafter, this proposal process has been reviewed by two other persons. Final conclusions of these three persons on this matching process were drawn in two meetings.

Accuracy2

Accuracy2 measures the level of agreement between individual participants' assessed *level of importance* related to identified client's business risks and the expert panel's importance assessments.

The four individual expert panelists were asked to distribute 100 points of importance to the list of client's business risks they had identified in the first task during the expert meeting. From this task, a mean importance level per important client's business risk was computed. The participants in the experiment were asked to distribute 100 importance points to their top five of most important client's business risks.

Accuracy2 has been computed per experiment participant as:

$$\left[IP_R * MIP_{EP}\right] \div 100$$

Where IP_R = importance points of client's business risk identified by experiment participant (only those identified business risks are taken into account that matched with the expert panel's list of identified business risks) and

MIP_{EP} = mean importance points attributed to those matching risks by the expert panel 100.
Consider the following example.

Table 3.5 Example of risk identification

Top five of business risks identified by a participant	Participant importance assessment	Match with panel?	Panel business risk	Mean expert panel importance assessment
1. Price competition	20	1	Due to focus on price, risk for long-term profitability	10
2. Limited number of principals	10	-	Not applicable	-
3. Business operations dependent of director	30	1	Dominant position director	12.5
4. Financial position	20	-	Not applicable	-
5. Changing demand (market)	20	-	Not applicable	-
	100	2		

For this example, accuracy1 and accuracy2 are:

- Accuracy1: number of matching client business risks: score = 2 (see column 3)
- Accuracy2: multiply respondent's and expert panel's weights for matching risks:
  i.e. [(20*10) + (30 * 12.5)] /100 = 5.75

This fictitious respondent of Table 3.5 identifies five client's business risks of which only "price competition" and "business operations dependent of director" match with the list of risks identified by the expert panel. An accuracy1 score of "2" results. As the maximum possible score is 5, this respondent misses three important risks identified by the expert panel. In a similar way accuracy2 is calculated. For the two risks that match with the expert panel's list of risks, the respondent's weights (depicting the relevance of the individual risk) are multiplied with the respective expert panel's weights. Accuracy2 hence is in that regard related to accuracy1, but shows another aspect of judgment performance, namely the relative importance of the risks identified.

Advantages/disadvantages of accuracy calculation

Prior research studies computed accuracy using various different formulas. The accuracy calculation formula needs to be designed such that the results can be easily interpreted and that they fit with the research design.

Accuracy1

Accuracy1 has been calculated as the number of client's business risks identified by participants with the list of client's business risks identified by an expert panel. With respect to this formula, the following remarks can be made:

- The formula takes into account only the matching client's business risks and does not take into account a penalty for non-matching risks. For example, Bonner's (1990) study chose to provide participants a bonus for having selected cues that were appropriate given the case setting, but to provide participants a penalty for having selected cues that were inappropriate. In her case-setting, distinguishing between 'good' and 'wrong' was possible, which was not the case in the current empirical study. Both the expert panel and participants were asked to identify the top five of client's business risk factors. This implies that participants may have identified risk factors that did not match with the expert panel's list but potentially included factors that were not obviously wrong, but only less important compared to the expert panel's list. Had a penalty been included in the accuracy formula, the participant would be too heavily penalized for having identified a risk that was not obviously wrong.
- An important advantage is that the accuracy results can be easily interpreted: an increase of an accuracy-score implies improved judgment performance. Differences in judgment performance across auditors can be analyzed in terms of rate of deviation with the expert panel's list which is good benchmark.

Accuracy2

Accuracy2 has been calculated as: the number of client's business risks that match with the expert panel's list times the importance weight applied to this risk by the expert panel. Accuracy2 2 aims to measure the judgment performance of auditors regarding the importance weights they applied to identified client's business risks. With respect to this formula, the following remarks can be made:

- In conformity with the accuracy1 calculation formula, no penalty has been taken into account for non-matching client's business risks.
- For accuracy calculations related to importance weights, an alternative way of measuring would be to compute the difference (instead of multiplying) the participant's weights with the expert panel's weights. Although this would be possible, it would result in a methodologically unsound measure since the weights calculated for the expert panel did not result from the same weighting process compared to the participant's weighting process. The experts from the expert panel were first requested to identify the most important business risks, which resulted in

a list of 15 business risks. The experts were subsequently individually requested to apply importance weights to the 15 business risks, their individual weights summing up to 100. Afterwards, we have re-calculated these importance weights by averaging the importance weights of the four experts to the individual 15 business risks. Since the experiment participants were limited to identifying the top five of client's business risks and dividing 100 points over these 5 business risks, the participant's weights for each of the risks identified were by definition higher compared to the average expert panel weights. Deduction of participants' weights from the expert panel's weights would result in a skewed distribution and would not result in an easily interpretable measure.

Accuracy3 and Accuracy4

Accuracy1 and accuracy2 were concerned with the auditors' judgment performance regarding the identification of *client's business risks*. Accuracy3 and accuracy4 are concerned with the auditors' judgment performance regarding the identification of *client's entity-level controls*. Although the task content differs (client's business risks versus client's entity-level controls), both tasks are actually the same. Hence, accuracy 3 (measuring the level of agreement between individual participants' identified *client's entity-level controls* and the expert panel's list of identified client's entity-level controls) is calculated in the same way as accuracy1. The list of controls identified by the expert panel as a whole contains in total 21 entity-level controls. In the same way, accuracy4 (measuring the level of agreement between individual participants' assessed *level of appropriateness* related to identified *client's entity-level controls* and the expert panel's appropriateness assessments) is calculated in the same way as Accuracy2. The advantages and disadvantages described for the accuracy1 and accuracy2 formula equally apply to the accuracy3 and accuracy4 formula.

For accuracy3 and accuracy4 the same matching process has been performed as has been conducted for the calculation of accuracy1 and accuracy2.

The next section deals with the dependent variable of the auditors' judgment performance in an assessment task (as opposed to the identification tasks that are previously discussed).

Consensus and other measures of judgment performance (assessment task)

The dependent variables related to the experimental task 'assessing the impact of various combinations of business risks and entity-level controls on audit risk' (i.e., an assessment task), are described in the current section. For this task no external judgment performance criterion was available. From previous empirical studies on audit risk, it follows that various studies (e.g., Ashton 1973; Bonner, 1990; Meixner and Welker 1988; Stone and Dilla, 1994) have used an adapted version of the so-called Lens Model to compute the dependent judgment performance variables. This model, originally developed by Brunswik (e.g., Brunswik, 1952), distinguishes the following dependent variables:

- Consensus amongst experiment participants;
- Judgment stability of experiment participants;
- Experiment participants' cue-usage.
- Experiment participants' level of self-insight;

These dependent variables are subsequently described in the subsequent sub-sections. But first we provide an overall description of the Lens model.

Description of the 'lens model'

The Lens model has been developed originally in the psychology discipline by Brunswik in 1952. Although the Lens model has been slightly adapted by various researchers since 1952, the basics of the model are still applicable and widely used. Since the introduction of the Lens model, it has been used in many academic disciplines. The model is often used in policy-capturing studies. Policy-capturing is a method that describes an individual's evaluative judgment process with algebraic models (Cooksey, 1995). An attractive aspect of the Lens model is that it incorporates both the external and unpredictable environment as well the (internal) process of judgment and decision making within individuals. Hence, the model sheds light on how judgment processes within individual persons take place making the judgment process measurable and comparable to that of other individuals. According to this view the real world is simplified into two aspects, namely the individual who makes decisions and the environment of the individual. The model is used in the current study to measure various aspects of consensus: (1) consensus within individual auditors (with the same kind of judgments

over time; meant to measure the stability of judgments; i.e., the auditors' judgment stability), and (2) consensus between (groups of) auditors. For the experiment, this means that only the assessment activities (assessment of the impact of client's business risks and client's entity-level controls on audit risk) (see section 3.3.5) are examined with use of the Lens model whereas the identification activities are measured making use of accuracy variables. Because there is no accuracy-like instrument available to measure consensus on cue assessments, the Lens model is a good alternative way of measuring judgment performance (Bonner, 1990).

The model is called 'Lens model' because "it resembles light arrays emanating from a light source through a convex lens and converging to another point" (Ashton, 1973, p. 55). Translated to the experiment, this means that the audit environment is sending its arrays/information cues which come together in the individual's mindset. The model thus captures the policy of decision making within an individual's brains (environment's perceptions).
The first application of the Lens model in the accounting/auditing discipline has been the thesis of R.H. Ashton (1973). Thereafter, many studies followed which also used the model. For example: Bonner (1990), Stone *et al.* (1994). The basic theorem Brunswik used, is called 'probabilistic functionalism' which has two primary emphases (Cooksey, 1995, p.1): "(1) the chief task of psychology was to understand the functional relationship between the organism and its environment, and (2) the essence of this organism-environment relationship is necessarily based on probabilistic (uncertain) relations among environmental variables." This uncertainty as well as uncertainty inherent to individual's judgments and decisions is one of the basic reasons for incorporating an expert panel in the current research design. The outcomes of the expert panel meeting have been used to select specific cues for the assessment task in the experiment which has led to further improvement of the external validity of the research design.

In its basic form the Lens model consists of the following formula (see Bonner, 1990, p.85):

$$r_a = G * R_1 * R_2 + C (1-R_1) (1-R_2)$$

Where

r_a = correlation between subject 1 and 2's judgments (here associations between audit risk judgments)

G = correlation between predictions based on models of subject 1 and 2's judgments, or the 'matching index'

R_i = consistency of subject i in applying his or her judgment policy (from a linear regression of the subject's judgments on the four cues) and

C = correlation between the residuals from the subject 1 and 2's models (configurality or some other form of non-linearity)

The Lens model is based on the linearity assumption, namely the linear relation between cues and distal variables on the one hand and the linear relation between the cues and the individual judge's assessment on the other hand. From several studies it is concluded that using non-linear models will not significantly increase the descriptive power of the model. That is, the linearity-assumption will not severely impact the outcomes of the model although some authors (e.g. Solomon & Brown, 1991) assume configural (i.e. non-linear) cue-usage by judges.

Cue utilization

The Lens model equation indicates the manner in which the individual auditor utilizes the cues in arriving at the final impact on audit risk assessment. Cue utilization is reflected in the following linear regression terms:

$$\acute{Y}_s = b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4$$

In this equation, $\acute{Y}_s$ is the optimal prediction of the auditors' judgment of the impact of a cue or cue combinations on audit risk. X_1, X_2, X_3 and X_4 are the cues and b_1 to b_4 are the regression weights indicating the extent to which the auditor has used each cue in arriving at the assessment of the impact of the cues on audit risk.

Consensus amongst (groups of) auditors

As described in Figure 3.2 (experiment tasks 3 and 4) participants in the experiment were requested to assess the impact of two client's business risks and two client's entity-level controls on audit risk for the financial statement account Work in Progress. In sum, participants performed this assessment task for fifteen different combinations of these client's business risks and client's entity-level controls. Judgment consensus is defined as the level of agreement amongst each pair of judges (experiment participants) over the fifteen different combinations. The following procedure has been conducted in order to compute the level of consensus (in conformity with Cooksey, 1995):

1. For each pair of auditors 2-tailed Pearson correlations were computed. This resulted in a total number of 3,570 correlation coefficients ([(85 participants * 85 participants) -/- 85 participants] / 2).
2. These resulting correlation coefficients were coded with a reference to the relating pair of auditors.
3. This coding assisted in the run of group comparisons according to the independent variables of interest, which will be discussed in Section 4.5. Each pair of auditors, hence, was assigned to a group of interest, and in case a pair of auditors did not fit into a group, this pair was classified as 'other'.
4. Then, group means were computed in order to make comparisons of judgment consensus across various groups of auditors possible.
5. With the purpose of assessing the significance of the group differences found, all correlation coefficients were re-calculated with so-called Fisher r to Z transformation, to adjust for non-normality.

Table 3.6 provides visualization related to the previously mentioned first procedure.

Table 3.6 Example of pair-wise correlations

Cue combinations[15]	**Participant 1**	**Participant 2**
1	3,00	6,00
2	5,00	4,00
3	5,00	8,00
4	2,00	4,00
5	2,00	2,00
6	2,00	4,00
7	2,00	2,00
8	2,00	8,00
9	2,00	4,00
10	-4,00	-4,00
11	6,00	8,00
12	2,00	4,00
13	-4,00	-4,00
14	4,00	8,00
15	-4,00	0,00

[15] See Table 3.3 for an example of possible cue combinations (first column).

In the example of Table 3.6, the mutual consensus variable – as measured by the two-tailed Pearson correlation – is .877 ($p < .1$). The accompanying Fisher r to Z transformed value is 1.363.

Judgment stability of participants

As visualized in Figure 3.2 experiment participants were first requested to assess the impact of client's business risks and entity-levels controls on audit risk for fifteen cue combinations. In addition, the experiment participants were provided with four repeat cases, which equaled four out of the fifteen previous cases in order to measure the auditors' stability of judgments (consensus within individual auditors). For each participant judgment stability has been computed as the paired Pearson correlations of the four repeat cases with the four original cases. The judgment stability measure was used in order to assess the impact of the risk of 'demand effects' (participants' fatigue and boredom due to lengthiness of the questionnaire).

Cue usage of participants

Cue usage is the objective weight experiment participants attributed to each of the four cues used in the experiment in assessing their impact on audit risk, namely two client's business risks and two client's entity-level controls. For each participant, a linear regression form was computed. The (objective) cue weights were the raw regression weights of these linear regressions.

Self-insight of participants

The level of self-insight of the experiment participants refers to the self-insight related to their ("objective") cue usage. Self-insight was computed per participant as the correlation between the "objective" cue weights and their "subjective" cue weights. This computation is regularly applied in lens model research. The subjective cue weights for the four cues were separately asked in the debriefing questionnaire. Specifically, participants were asked to attribute 100 cue weight points to each of the four cues. In order to make the objective (i.e., raw regression) weights comparable to the subjective cue weights, the

objective cue weights were recalculated to add up to 100. Congruent with our statement regarding to judgment stability, the participants' level of self-insight was used with the purpose of increasing the internal validity of the research design.

A specific aspect of the self-insight computation in the current empirical study is that the business risk cues are assumed to have a positive impact on audit risk (i.e., audit risk increasing) where entity-level control cues are assumed to have a negative impact on audit risk (i.e., audit risk reduction). In other empirical studies making use of the lens model, the cues included in the research design only have a positive impact on the dependent variable. I am not aware of any empirical studies which included both risks and controls in the cue selection. The fact that in the current empirical study cues with a positive or a negative impact on audit risk have been included does not appear to be problematic in the calculation of self-insight. Regarding the computation of the objective cue weights, these cue weights have been re-calculated to an absolute (i.e., positive) value. This is possible given the fact that the scales used for the impact on audit risk assessment range from -10 to +10 where the centre of the scale is 0. This implies that respondents assess each case (combination of various cues present) relative to the same scale centre. Whether a cue has a positive or a negative impact on audit risk does not make a difference.
With respect to the computation of subjective cue weights, participants were – as described – requested to distribute 100 points of importance to each of the four cues. These four cues included both business risks and entity-level controls. First, none of the participants indicated in the debriefing questionnaire that they experienced difficulty in attributing a positive importance weight to entity-level control cues. Second, each participant related the (subjective) importance of the four cues towards the same scale centre. A participant attributing more points of importance to entity-level control cues compared to business risk cues, implicitly assessed a risk-reducing (i.e., negative) impact of the four combined cues on audit risk.

3.5 Independent variables

In chapter 2 hypotheses have been developed describing the potential impact of independent variables on the auditors' judgment performance. For both identification and assessment tasks, the same independent variables are included in these hypotheses except for the variable 'level of risk-aversion' which is only included in the

statistical analyses with respect to the assessment task. Subsequently the measurement of the following independent variables will be discussed:

- The level of experience;
- The level of feedback when conducting audit risk assessments;
- The level of risk-aversion.

3.5.1 The auditors' level of experience

In section 3.5.1, three different types of the auditors' experience will be discussed:

- The auditors' level of general experience in the auditing field;
- The auditors' level of industry-specific experience;
- The auditors' level of task-specific experience.

The auditors' level of general experience in the auditing field

The auditors' level of general experience in the auditing field has been measured in terms of the number of years the participant has been engaged in a specific audit firm (in conformity with, for example, Bonner 1990). Wright (1988, p. 309) reasoned that the mixed results of prior research studies on the impact of general experience in auditing on the auditors' judgment performance might be attributable to the relatively limited range of experience levels included in prior studies. Studies typically focused on experience levels between one and three years of experience. The current empirical study extends the range of experience levels by both including audit managers and auditing students in the research design.

The auditors' level of industry-specific experience

In section 3.3.3, it was described that in the research design of this empirical study the construction industry has been selected. Measuring the auditor's level of industry-specific experience is, thus, related to the auditors' experience in the construction industry. Prior studies have used 'designation as industry specialist' as variable measuring industry-specific experience (e.g., Wright and Wright 1997; Solomon *et al.* 1999) or 'number of industry-specific audits performed' (e.g., Taylor 2000; Wright and Wright 1997) or 'hours of staff training directed towards a specific industry' and 'years of non-public accounting experience in a specific industry (e.g., Wright and Wright 1997).

Wright and Wright (1997) stated that “since there is no variable recognized which is an optimal measure of industry, alternative measures provide the opportunity to examine the effect of different dimensions of the notion of industry experience”.

In this empirical study three dimensions of industry-specific experience have been examined:

- Estimated annual number of hours spent on (construction) industry-specific training (cf. Taylor, 2000; Wright and Wright 1997);
- Estimated annual number of days spent on knowledge acquisition related to the (construction) industry;
- Estimated cumulative number of hours spent over three years on (construction) industry-specific audit engagements. This dimension has been used as alternative measure to ‘number of industry-specific audits performed’ (Taylor, 2000; Wright and Wright, 1997). The measure ‘number of audits performed’ is insufficiently specific in terms of clients versus engagements (e.g., if an auditor is involved in the audit of two subsidiaries of a construction company, does that count for one or two audits?) and it is also insufficiently specific in terms of the amount of time that an auditor is involved in the audit of industry-specific companies. For that reason a period of 3 years has been used in this thesis. Estimating a number of audit hours is as such subjective and has thus been shortened to a period of 3 years, which falls within a reasonable period of time with which an auditor can estimate the number of hours.

Based upon analysis of the debriefing questionnaires, the first and second industry-experience measure turned out to be no accurate measure of industry-experience. Participants reported that the Big4 audit firms do not provide much industry-specific training to specialists in the construction industry. In addition, auditors do not distinguish as industry-specialist in spending time on knowledge acquisition in the construction-industry. As a result, only the third measure will be used in the empirical analysis of the potential impact of industry-specific experience on the auditors’ judgment performance.

The auditors’ level of task-specific experience

Bonner (1990) made a distinction concerning her experiment on control risk and analytical risk assessments between inexperienced and experienced auditors. In this regard, an experienced auditor was defined as “one who has training and extensive experience in both control risk assessments and analytical risk assessments; such

experience is held by managers (auditors with about five to seven years of experience). An inexperienced auditor is one who has extensive training and some experience in control risk assessments and minimal to no training and experience in analytical risk assessment. Staff auditors with two years of experience with two years of experience meet this criterion".

This thesis has made the same (high-level) distinction between inexperienced (i.e., auditing students) and experienced auditors (audit managers). Bonner's measurement of task-specific experience, however, is based on assumptions which can differ across audit firms. As the current empirical study comprised more than one audit firm, the independent variable 'task-specific experience' has been measured as a continuous variable (i.e., not only a discontinuous distinction has been made between experienced and inexperienced auditors, but participants have been specifically asked to indicate the level of task-specific experience). Participants were asked to provide both the number of times and the number of estimated hours spent on each of the following tasks:

- The identification of client's business risks;
- The identification of client's entity-level controls;
- Assessing the impact of client's business risks on audit risk;
- Assessing the impact of client's entity-level controls on audit risk.

Hence, this way of measurement sheds more light on the actual level of task-specific experience on the selected audit tasks. The task-specific experience variables (based on their experience in the recent audit year) are presented in Table 3.7.

Table 3.7 Description of task-specific experience variables

Variable	**Description**	**Measurement in terms of**
IDBR1	Identification of client's business risks	Number of times task performed
IDBR2	Identification of client's business risks	Cumulative number of hours
IDBM1	Identification of client's entity-level controls	Number of times task performed
IDBM2	Identification of client's entity-level controls	Cumulative number of hours
WBR1	Assessing the impact of client's business risks on audit risk	Number of times task performed
WBR2	Assessing the impact of client's business risks on audit risk	Cumulative number of hours
WBM1	Assessing the impact of client's entity-level controls on audit risk	Number of times task performed
WBM2	Assessing the impact of client's entity-level controls on audit risk	Cumulative number of hours

3.5.2 The level of feedback in conducting audit risk assessments

In Chapter 2 it was hypothesized that the (perceived) level of feedback (when conducting audit risk assessments) would have a positive impact on the auditors' judgment performance.

Participants in the experiment were asked to indicate on an 11-point scale how often they received feedback from their supervisors having performed audit risk assessments. The scale-ends ranged from 'never' to 'always' (when conducting these tasks).

The variable 'perceived level of feedback' is part of training-on-the-job experience and, thus, might attribute the auditors' judgment performance in addition to the auditors' task-specific experience. Prior research (e.g. Waller and Felix 1984; Tuttle and Stocks 1988) on the impact of (outcome) feedback on the auditors' judgment performance is typically designed with feedback as a manipulated variable. This type of experiments, however, do not consider to what extent participants receive feedback in actual settings. In recent years, regulatory bodies and international auditing standards (e.g. POB 2000; ISA 200, section 18, 2003) have accentuated the need for adequate supervision on and performance evaluation of the auditors' audit documentation. The level of feedback has been measured in the current empirical study by a measured variable instead of a manipulated variable, hence reflecting the perceived level of feedback in current audit practice.

3.5.3 The level of risk-aversion

This section is concerned with the last independent variable used in this empirical study. The level of risk-aversion is not specifically related to the conduct of audit risk assessments, but is designed as a trait of people in general.

The participants were provided with a question regarding a gambling game (derived from Harrison, 1986). Participants could assume that they were to receive with 100% certainty an amount of € 10,000. Then, participants were asked which percentage of certainty they would need to accept receiving an uncertain amount of € 25,000. This % is used as a measure of risk-aversion. A higher % of required certainty corresponds with a higher level of risk-aversion. A break-even points exists at the level of 40% (i.e., 40% * € 25,000 = 100% * € 10,000).

In this empirical study, taking into consideration the level of risk-aversion, the aim was to find a single measure of risk-aversion. Harrison's (1986) study, however, examined a variety of possible situations (including variations on the amounts that could be won). As a result, the measure of risk-aversion used in the current empirical study is a simplified one. The amounts selected in the gambling game were chosen to reflect a real life setting and to include for most participants the trigger to choose for the uncertain situation.

3.6 Concluding remarks

This chapter has discussed the research design for the empirical study regarding the auditors' judgment performance. It was described that an experiment is conducted for the "identification tasks" (i.e., the identification of client's business risks and entity-level controls) as well as a quasi-experiment for the "assessment task" (i.e., assessment of the impact of selected client's business risks and entity-level controls on audit risk). In addition, it was described that an expert panel was constructed in order to develop an external evaluation criterion regarding judgment performance with respect to the "identification tasks" and to increase the external validity of the cues selected in the quasi-experiment.

The next Chapter will describe the empirical results regarding the auditors' judgment performance in the "identification tasks". Chapter 5 provides the empirical results regarding the auditors' judgment performance in the "assessment task".

4 Results of the experiment: judgment performance with respect to *identification* of client's business risks and entity-level controls

4.1 Introduction[16]

This chapter presents the experimental results related to the auditors' judgment performance regarding the tasks 'identification of client's business risk and client's entity-level controls'. Particularly, I examine whether the auditors' judgment performance is influenced by three types of experience (experience in the auditing field, industry-specific experience and task-specific experience) and two other independent variables which potentially influence the auditor's judgment performance in the experiment:

1 Level of feedback received from supervisors in conducting audit risk analysis;
2 Level of risk-aversion.

Judgment performance related to the task selected in the experiment has been measured by 'accuracy-scores'. The accuracy-scores measure the conformity of client's business risk factors and client's entity-level controls identified by auditors with the respective risk factors and controls identified by a panel of experts. The previous chapter elaborated more on the methodological aspects of the expert panel (including composition of the expert panel, due process of the expert panel's session, as well as the calculation of accuracy-scores). Recall from the previous chapter that for both the *identification* of client's business risks and the *identification* of client's entity-level controls, two distinct accuracy-scores have been calculated:

- A factor accuracy-score which measures to what extent the risk factors and controls identified by auditors match with the factors identified by the expert panel; and
- A weighting accuracy-score which measures to what extent the importance weights the auditors attached to the risk factors and controls match with the importance weights as developed by the expert panel.

[16] Due to confidentiality reasons, it was agreed with the participating firms not to report on the impact of the quality individual of auditors' judgments. In addition, the results presented in this empirical study will not refer to the names of the participating audit firms.

As such the accuracy-scores measure the judgment performance of individual auditors. The next chapter describes the empirical results regarding the *assessment* task. In the assessment task, judgment performance is measured by consensus, which implies the level of agreement among a group of auditors[17]. Whether and if so, to what extent, the accuracy-measure is related to the consensus-measure will be discussed at the end of the next chapter.

This chapter reads as follows. Section 4.2 starts with a preliminary exploration of the data obtained in the experiment. In section 4.3 the hypotheses related to the identification task, as developed in Chapter 2, will be repeated shortly. The sections 4.4.1 to 4.4.5 present the quantitative analyses of the results of the experiment, subsequently followed in sections 4.4.6 and 4.4.7 with the qualitative analyses of the experimental results. The chapter concludes with a summary in section 5.5.

4.2 Dataset

This paragraph provides a general overview of the composition of the dataset. The dataset contains responses of both audit managers ("experienced auditors") and auditing students ("novices to the task"). In the previous chapter it is argued that the task selected in the experiment is, due to task complexity and novelty of the task, performed by audit managers. Auditing students have been selected to serve as a benchmark to the group of audit managers. The preliminary analysis of the dataset is concerned with items addressed in the debriefing questionnaire, which primarily relate to the personal characteristics of the respondents in terms of experience and task-specific work environment. Subsequently, the following topics will be dealt with in this section 2:

- Overall descriptive statistics;
- Participants;
- Experience in the auditing field;
- Industry-specific experience;
- Task-specific experience.

[17] In this empirical study, two groups of auditors are distinguished (refer to section 3.3.2): a group of audit managers and a group of post-graduate auditing students.

4.2.1 Overall descriptive statistics

This section presents an overview of the descriptive statistics of the two target groups of this empirical study.

Descriptive statistics dependent variables

Tables 4.1 present the descriptive statistics regarding the dependent variables.

Table 4.1 Descriptive statistics dependent variables identification tasks

Variable	***n***	***Actual minimum***	***Theoretical minimum***	***Actual maximum***	***Theoretical maximum***	***Mean***	***Standard Deviation***
Audit managers							
Accuracy1	85	1.00	.00	5.00	5.00	2.46	1.03
Accuracy2	85	.50	.00	8.13	12.50[18]	3.82	1.84
Accuracy3	85	1.00	.00	5.00	5.00	3.68	1.03
Accuracy4	85	1.00	.00	13.88	22.50	8.18	2.71
Auditing students							
Accuracy1	20	0.00	.00	3.00	5.00	2.05	.83
Accuracy2	20	0.00	.00	7.00	12.50	3.35	1.93
Accuracy3	20	1.00	.00	5.00	5.00	3.95	1.05
Accuracy4	20	2.50	.00	13.25	22.50	9.12	2.80

Table 4.1 suggests that audit managers show higher judgment performance on the mean accuracy-scores (i.e., 2.46 and 3.82 respectively) compared to auditing students (i.e., 2.05 and 3.35 respectively) related to the identification of client's business risks. To the contrary, Table 4.1 suggests that audit managers show lower judgment performance on the mean accuracy-scores (i.e., 3.68 and 8.18 respectively) compared to auditing

[18] The theoretical maximum is achieved when a respondent allocates the maximum number of 100 points to a client's business risk factor that was ranked highest by the expert panel. The highest-ranking risk factor identified by the expert panel was 'Business operations are strongly dependent of the director' (mean expert panel 12.50). The same applies to accuracy4 where the highest ranked entity-level control was 'strong project control by periodical management information reports' (mean expert panel 22.50).

students (i.e., 3.95 and 9.12 respectively) related to the identification of client's entity-level controls. The Mann-Whitney test shows no significant ($p<.10$) differences between audit managers and auditing students on all accuracy-scores, see Table 4.2.

Table 4.2 Statistics Mann-Whitney test for assessing significance of accuracy differences between audit managers and auditing students

	Accuracy1	**Accuracy2**	**Accuracy3**	**Accuracy4**
Mann-Whitney U	672	729	702.5	666.0
Z	-1.520	-.988	-1.261	-1.502
Asymp. Sig. (2-tailed)	.129	.323	.207	.133

The participants were forced to limit their identifications to only the five most important client's business risks and entity-level controls. We need to take this into account when interpreting the overall means of accuracy1 (measuring the number of client's business risks) and accuracy3 (measuring the number of client's entity-level controls). On the one hand, it can be argued that participants did identify risks and controls that were not obviously wrong; these risks and controls or at least some of these 'lacking' risks and controls were simply not in the top five of the expert panel's list, which does not say these risks and controls were not important at all. On the other hand, it can be argued that these accuracy-scores leave room for further improvement (obviously, the participants' list of risks and controls did not fully match with the expert panel's list of *most important* risks and controls). In previous studies (e.g., Bedard and Maroney, 2000) it has been suggested that judgment performance in identification tasks can be improved by performing these tasks in group sessions (brainstorm will be helpful to idea generation in general and to risk factor identification in particular). Some participants reported in the debriefing questionnaire they would have liked to make use of the knowledge and experience colleagues, others would like to have used decision-aids like industry-specific templates (see also Bedard and Graham, 2002).

With respect to the mean accuracy-scores related to the importance attached to the client's business risks (accuracy2) and entity-level controls (accuracy4) also room is left for improved judgment performance. Comparing both these accuracy-scores reveals that on average accuracy4 is much higher than accuracy2 for both audit managers and auditing students. The most important cause underlying this finding is that both the expert panel and the participants viewed one single control as being the most important one, hence, distributing more of the 100 points to this single control. This control

involves tightened project control by periodic project control reports. This type of management information is important as it is used as a tool of management by which management can monitor individual projects (cost control) and act on these reports as a well as that management gets an overall view on the project portfolio. Most of the respondents identified this single control. As accuracy2 and accuracy4 are a multiplication of the participant's weights (on matching factors) with the expert panel's weights, this single control is solely responsible for the higher scores on accuracy4.

Descriptive statistics independent variables

Tables 4.3 and 4.4 present the descriptive statistics regarding the independent variables for audit managers and auditing students respectively.

Table 4.3 Descriptive statistics independent variables audit managers

Demographic question	***Categories (if applicable)***	***n***	***Minimum***	***Maximum***	***Mean***	***Standard Deviation***
Big 4 Audit Firm	1	20				
	2	25				
	3	25				
	4	15				
Direct work-experience in Construction-industry	Yes	4[19]				
	No	81				
Construction-industry specific training	Yes	13				
	No	72				
Number of days spent on gathering industry-specific knowledge[20]	Yes	58				

[19] Given the fact that a very low number of participants indicated that they had prior direct work experience in the construction industry (outside the auditing field), this variable has not been included in the empirical analysis.

[20] 58 participants indicated that they spent some time during the year on gathering industry-specific knowledge. Given the extreme variance in indicated number of days spent on this knowledge-acquisition process, it has been assumed that various participants had difficulty in applying a number of days to this question. Probably, other participants may have experienced difficulty in interpretation of the question. Would this for example also include reading the newspaper, formalized industry-specific training, and

Demographic question	*Categories (if applicable)*	*n*	*Minimum*	*Maximum*	*Mean*	*Standard Deviation*
	No	27				
	Overall		0	150	6.32	18.16
Client-size of industry-specific engagements	Mainly large clients	19				
	Mainly small/medium-sized	28				
	No clients	38				
Desirability of tool-usage when completing questionnaire	Yes	34				
	No	51				
General experience in auditing (years)		85	5	42	13.02	6.64
Industry-specific experience (hours)		85	0	3,000	536.94	687.50
Task-experience (IDBR1)[21]		83	0	50	9.88	7.26
Task-experience (IDBR2)[22]		83	0	192	39.55	34.50
Task-experience (IDBM1)[23]		84	0	50	9.79	7.22
Task-experience (IDBM2)[24]		84	0	500	56.56	70.13
Feedback		84	0	10	5.27	2.71
Autonomy[25]		84	3	10	8.03	1.13
Risk-aversion		82	0	100	65.07	24.46

discussing industry-specific issues with colleagues, etc.? Given the potential for controversy, this variable has not been included in the empirical analysis.

[21] IDBR1 is measured as the number of times respondents conducted the task 'identification of client's business risks' last year.

[22] IDBR2 is measured as the number of hours respondents spent on the task 'identification of client's business risks' last year.

[23] IDBM1 is measured as the number of times respondents conducted the task 'identification of client's entity-level controls' last year.

[24] IDBM2 is measured as the number of hours respondents spent on the task 'identification of client's entity-level controls' last year.

[25] This variable initially was supposed to be the opposite of the variable 'Feedback'. This variable has not been included in the empirical analysis given the multi-interpretability of the variable.

Table 4.3 shows that all Big4 audit firms are represented well in the data-set. The cooperation of the Big4 audit firms – specifically the assistance of the technical departments in ensuring a high response rate - with this empirical study has contributed to the participation of each firm in this empirical study.

Table 4.3 shows that audit managers' general experience in the auditing field ranges from five to 42 years. In The Netherlands, audit firms – in addition to the requirement of having completed the Auditing education - use a minimum level of general experience of five years as a minimum requirement to promote senior staff to audit manager.

Table 4.3 also shows that audit managers have relatively little experience in the construction industry outside the auditing field (e.g., in functions like work foreman, calculation departments etcetera). The measure of industry-specific experience in terms of audit hours assigned to industry-specific audit engagement appears to be the most representative measure of industry-specific experience compared to the other measures used in this empirical study. Auditor's experience in industry-specific audit engagements is related to both large (19 auditors) and medium-sized/small audit engagements (28 auditors).

With regard to the mean levels of task-specific experience, Table 4.3 suggests that on average Audit managers perform the identification tasks (both the identification of client's business risks and the identification of entity-level controls) approximately ten times a year. As a rule of thumb this number comes near to the average number of audit engagements an audit manager is assigned to. Audit managers spend on an annual basis more time on the identification of client's entity-level controls (56 hours) compared to the time spent on the identification of client's business risks (40 hours). Both estimations of time spent on the tasks seem to be relatively low. This might be explained by the fact that the role of the audit manager in performing these tasks has slightly changed from 'executing' to 'supervising'.

Table 4.3 further suggests that audit managers perceive to receive on average sometimes feedback (mean level of feedback 5.27) when conducting audit risk assessments.

Finally, Table 4.3 indicates that audit managers are relatively risk-averse (level of risk-aversion of 65 where a level of 40 would indicate a risk-neutral level).

Table 4.4 Descriptive statistics independent variables auditing students

Demographic question	***Categories (if applicable)***	***n***	***Minimum***	***Maximum***	***Mean***	***Standard Deviation***
Big 4 Audit Firm	1	3				
	2	5				
	3	3				
	4	4				
	Other	5				
Direct work-experience in Construction-industry	Yes	0				
	No	20				
Construction-industry specific training	Yes	0				
	No	20				
Number of days industry-specific spent on gathering industry-specific knowledge	Yes	5				
	No	15				
	Overall	20	0	5.00	.75	1.62
Client-size of industry-specific engagements	Mainly big clients	1				
	Mainly small/medium-sized	3				
	No clients	16				
Desirability of tool-usage when completing questionnaire	Yes	7				
	No	8				
General experience in auditing (years)		20	1.5	5.0	2.85	1.18
Industry-specific experience (hours)		20	0	400.0	56.5	119.44
Task-experience (IDBR1)		20	0	20.0	7.2	6.57
Task-experience (IDBR2)		20	0	600.0	101.05	158.92
Task-experience (IDBM1)		19	0	30.0	9.16	8.17
Task-experience (IDBM2)		19	0	600,0	169.47	196.59
Feedback		20	2.0	10.0	6.8	2.50
Autonomy		20	3.0	9.0	6.15	1.95
Risk-aversion		19	20.0	95.0	72.63	20.10

Some introductory remarks follow from Table 4.4:

- Auditing students are – compared to audit managers – relatively inexperienced in terms of general experience (on average 2.85 years of experience, which corresponds to their attendance of a second-year post-graduate training course) and industry-specific experience (on average 56.5 hours were spent over the past three years on industry-specific audit engagements, which is explained by another element of Table 4.4: only four auditing students had some experience with industry-specific audit engagements).
- The level of the auditing students' task-specific experience is higher then could have been expected. Although auditing students perform the tasks less often compared to audit managers, auditing students spent on average far more time on these tasks. Explanation for the average time spent on the tasks for example might be: (1) auditing students actually execute the tasks, where audit managers supervise the execution of the tasks, (2) as a result of their relative lack of general experience, auditing students execute the tasks more inefficiently compared to audit managers (i.e., they need more time to complete the task).
- It is also clear from Table 4.4 that auditing students perceive to receive more feedback when conducting audit risk assessments compared to audit managers. Finally, auditing students seem to be slightly more risk-averse compared to audit managers.

4.2.2 Participants

The experiment has been limited to the Big4 audit firms in The Netherlands[26]. For the group of audit managers, 120 case materials and questionnaires have been sent to firm representatives. These firm representatives were requested to distribute these materials to an equal group of audit managers with substantial experience in the construction industry, and a group of audit managers having no experience in the construction industry. In total, 85 audit managers participated in the experiment (with a minimum of 16 participants and a maximum of 26 participants per firm). As in total 120 questionnaires have been distributed, this equals a 70.8% response rate. A group of 20 post-graduate auditing students was provided with the experiment materials during a course at the 'Vrije Universiteit Amsterdam' and includes both auditing students employed at Big4 audit firms (75%) as well as non-Big4 audit firms (25%).

[26] When the experiment was conducted (2003), the Big4 audit firms in The Netherlands were: Deloitte, Ernst & Young, KPMG, and PriceWaterhouseCoopers.

4.2.3 Experience in the auditing field

Audit managers had on average 13.02 years of experience in auditing with a minimum of 5 and a maximum of 42 years of experience (standard deviation of 6.64). The detection of outliers was performed, using a threshold of 3 times the standard deviation (Stevens, 1996). This resulted in the identification of two outliers (respondent 73 with 42 years of experience and respondent 67 with 35 years of experience). The reported mean of 13.02 years of experience reflects regular career patterns in Big4 audit firms. In these audit firms, auditors are promoted to audit manager, regularly having a minimum of 5 years of experience and having successfully completed the auditing education. Differences in experience in the auditing field were not significant across the participating audit firms.
Auditing students reported a mean of 2.85 years of experience in the auditing field, ranging from 1.5 to 5 years. The Independent Samples t-test shows that the level of experience in the auditing field significantly differed between the two groups (t = 6.795; df = 103; mean difference = 10.168; p = .0; equal variances assumed).

4.2.4 Industry-specific experience

In order to get a relatively high number of respondents with high-levels of industry-specific experience, firm representatives (recognized as “industry leaders by the audit firm”) have been asked to distribute 15 questionnaires to audit managers with considerable industry-specific experience in the construction industry.

Out of 85 audit managers, 19 audit managers serve large audit clients in the construction industry, 28 audit managers serve medium-sized clients in the construction industry and 38 audit managers did not serve audit clients in the construction industry.
The level of industry-specific experience (as measured by the sum of estimated number of hours spent on industry-specific audit clients in the past three years) varied between 0 and 3,000 hours with a mean of 536.9 hours (standard deviation of 687.5). Other studies, e.g., have measured industry-specific experience by: designation as specialist by the firm (e.g. Taylor, 2000; Solomon *et al.,* 1999), or number of industry-specific engagements, number of industry-specific clients, number of training hours directed toward a specific industry, and years of non-public accounting industry-specific

experience (e.g., Wright and Wright, 1997). Recently, Neal and Riley (2004) advocated a market share or portfolio share approach related to auditor specialization. One outlier (with hours more than 3 times the standard deviation) has been detected (respondent 25 with 3,000 hours).
A total of 14 out of 20 students reported no construction industry-specific experience at all. The other 6 respondents had an average industry-experience of 56.5 hours over the past three years (differences between the two groups are significant, t=3.103, $p = .002$).

In chapter 2 it has been discussed that audit firms in the late nineties were organized around industries. The decision of audit firms to distinguish several industries within the audit firm is based upon factors such as (improvement of) audit efficiency and audit effectiveness. In addition, marketing arguments support segmentation of the audit practice. E.g., clustering industry-specific knowledge within the audit firm will be helpful to individual audit managers in discussions with industry-specific clients about industry issues like trends in the industry, industry-specific risks, etc. The reported mean of industry-specific experience in terms of hours spent on industry-specific audit clients reported over the past three years (536.9) indicates that the construction industry within audit firms is distinct from other industries, e.g. the industries Financial Services, Healthcare and Government (local/country-level) industries[27]. The level of industry-specific experience – as described above by the number of audit managers with industry-specific experience (47 auditors compared to 38 auditors with no industry-specific experience) and the mean level of industry-specific experience (536.9) - is expected to be a good indicator of the auditors' expertise in the construction industry. Table 4.5 shows the mean levels of industry-specific experience (as measured in terms of hours spent on industry-specific engagements over the past three years) of the participants per audit firm.

[27] E.g., Solomon *et al.* (1999) reported that "over the past five years, the financial (health) specialists had spent, on average, 74% (63%) of their time working on audits. Taylor (2000) reports for banking specialists over a period of two years a similar percentage (74%). Wright and Wright (1993) report a mean of 3.5 retailing engagements for their participants on an annual basis. Although these measures of industry experience are different (and the study of Solomon et al. (1999) does not describe how many hours are involved with financial/health clients), both studies show clearly that health and financial specialists devote more time to their industry of specialization compared to the retail specialists.

Table 4.5 Mean levels of industry-specific experience of participants per audit firm

Firm	Mean industry-specific experience
1	371.5
2	455.4
3	574.8
4	821.9
Total	536.9

Based upon the Scheffé test for multiple post-hoc comparisons the mean levels of industry-specific firms did not significantly differ across firms. However, when firm 4 was compared with the other three firms combined, a significant difference was reported based on the Mann-Whitney test ($p = .01$).

The audit managers' level of experience in the auditing field does not significantly correlate (after adjustment for three outliers) with the level of industry-specific experience (2-tailed Pearson correlation of .008, $p = .947$, $n = 82$). The auditing students' level of experience does also not significantly correlate with the level of industry-specific experience (2-tailed Pearson correlation of -.041; $p= .863$; $n =20$).

4.2.5 Task-specific experience

With respect to task familiarity, we have asked participants to provide details on their experience with identification of client business risks and entity-level controls as well as with the assessment of the impact of client business risks and entity-level controls on audit risk. All task familiarity variables are measured in terms of the 'number of times task performed in the last year' and 'number of hours spent on the task in the last year'. Table 4.6 reports the audit managers' descriptive statistics for each of the distinguished task-familiarity variables. In Table 4.6, two outliers have been excluded (respondent 73, e.g., reporting 50 times the identification of client's business risk task; and respondent 81 with 500 hours spent on the identification of entity-level controls).

Table 4.6 Audit managers' task-specific experience

Task	Description	n	Minimum	Maximum	Mean	Standard dev.
Identification of client business risks (CBR)	Number of times performed	81	0	30	9.39	5.80
	Number of hours spent	81	0	192	38.68	34.24
	Average time spent on task	80	1	33.33	5.09	5.57
Identification of client's entity-level controls (EWC)	Number of times performed	82	0	27	9.29	5.76
	Number of hours spent	82	0	256	50.93	50.75
	Average time spent on task	80	.58	36	6.48	6.02
Assessment of impact of CBR on audit risk	Number of times performed	82	0	30	9.70	6.08
	Number of hours spent	82	0	200	38.00	35.79
	Average time spent on task	80	.67	20	4.43	3.44
Assessment of impact of EWC on audit risk	Number of times performed	81	0	30	9.70	6.25
	Number of hours spent	81	0	200	42.37	37.04
	Average time spent on task	79	.42	20	5.19	4.09

The n as reported in Table 4.6 does not equal 83 (85 respondents minus two outliers) because of missing values. On the whole, 3 respondents indicated having performed the task in the past year more than 20 times. Out of 81 audit managers, 35 reported having performed the identification of client's business risk task less than 10 times last year, where 46 audit managers reported having performed this task more than 10 times. The means (e.g., the means of the number of times the four tasks have been performed is higher than nine) of all task-familiarity variables as reported indicate that most of the participating audit managers are sufficiently familiar with the tasks selected in the experiment. As a rule of thumb, the client portfolio of an individual audit manager regularly comprises 10 to 20 different clients (depending on client size). Taking this rule of thumb into consideration it is suggested that audit managers perform the tasks presented in Table 4.6 for the majority of their clients.

Table 4.7 reports the mean levels of task-specific experience of participants per individual audit firm.

Table 4.7 Mean levels of task-specific experience of participants per audit firm[28]

	IDBR1	IDBR2	IDBM1	IDBM2
Firm 1	9.6	29.3	9.7	27.3
Firm 2	9.2	35.0	10.0	59.9
Firm 3	7.8	44.9	8.1	63.1
Firm 4	14.2	52.2	11.9	78.8
Total	9.9	39.6	9.8	56.6

Based on the Scheffé test for multiple post-hoc comparisons, a significant difference between firm 3 and firm 4 has been reported regarding the task 'identification of client's business risks' as measured by IDBR1 ($p = .06$). Table 4.7 suggests that firm 4 is mostly distinguished from the other firms. Based on the Mann-Whitney test it was reported that firm 4 significantly differed from the other firms both for IDBR1 and IDBR2 ($p = .04$ and $p = .07$ respectively), but not for IDBM1 and IDBM2. No clear-cut explanation is available related to this finding.

Additionally, the task familiarity variables have been correlated with experience in the auditing field and industry-specific experience. The 1-tailed Pearson correlations are presented in Table 4.8 ($p<.1$).

[28] See legend to Table 4.8 for definitions of variables.

Table 4.8: 1-tailed Pearson correlations task-specific with experience in the auditing field and industry-specific experience (audit managers) (significance p < .1)

	Idbr1	**Idbr2**	**Wbr1**	**Wbr2**	**Idbm1**	**Idbm2**	**Wbm1**	**Wbm2**
Expyears	.011 (.461)	.025 (.414)	.060 (.297)	-.073 (.259)	-.166 (.069)*	-.294 (.004)*	-.032 (.388)	-.237 (.017)*
Hours	-.241 (.016)*	.143 (.103)	-.186 (.049)*	-.023 (.418)	-.224 (.022)*	-.067 (.276)	-.300 (.003)*	-.064 (.287)
Idbr1		.301 (.003)*	.914 (.000)*	.401 (.000)*	.686 (.000)*	.157 (.083)*	.866 (.000)*	.342 (.001)*
Idbr2			.276 (.007)*	.612 (.000)*	.128 (.129)	.438 (.000)*	.229 (.021)*	.531 (.000)*
Wbr1				.475 (.000)*	.698 (.000)*	.212 (.028)*	.886 (.000)*	.353 (.001)*
Wbr2					.335 (.001)*	.730 (.000)*	.414 (.000)*	.864 (.000)*
Idbm1						.340 (.001)*	.759 (.000)*	.363 (.000)*
Idbm2							.281 (.006)*	.841 (.000)*
Wbm1								.409 (.000)*
Wbm2								

Legend to Table 4.8 (significance between brackets; p < .1 is significant):

- Expyears: years of experience in the auditing field;
- Hours: industry-specific experience; hours spent over past three years on audit clients in construction industry;
- Idbr1: Number of times the task 'identification of client's business risk' performed in last year;
- Idbr2: Number of hours spent on the task 'identification of client's business risk' in last year;
- Wbr1: Number of times the task 'assessing the impact of client's business risk on audit risk' performed in last year
- Wbr2: Number of hours spent on the task 'assessing the impact of client's business risk on audit risk' in last year;
- Idbm1: Number of times the task 'identification of client's entity-level controls' performed in last year;
- Idbm2: Number of hours spent on the task 'identification of client's entity-level controls' in last year;
- Wbm1: Number of times the task 'assessing the impact of the client's entity-level controls on audit risk' performed in last year;
- Wbm2: Number of hours spent on the task 'assessing the impact of the client's entity-level controls on audit risk' in last year.

From Table 4.8 the following conclusions can be drawn:

- A significant negative correlation (-.229; -and -.302, respectively[29]) has been reported between experience in the auditing field and task-specific experience related to the identification of client's business risks and entity-level controls (as measured by the number of hours spent on these tasks). This implies that as the audit managers' experience in the auditing field increases this is accompanied with a decreasing involvement in the two tasks. From a practical perspective this can probably be explained by the changing content of the task over time. E.g., in the period just after being promoted to audit manager, the audit manager performs the task him/herself. After some years, new promoted audit managers become involved in the task and the more experienced audit managers' role changes from 'performing the task' to 'reviewing and supervising the task performed by other audit managers'. Another explanation can be that more experienced audit managers perform the tasks in less time (more efficiently) compared to the less experienced audit managers. The debriefing questionnaire contained a question related to the 'task environment' in terms of the level of feedback a manager receives when performing the task. Pearson correlation between years of experience in the auditing field and the feedback measure also point in the direction of changed content of the task over time. The 2-tailed Pearson correlation between Experience in the auditing field and Feedback is negative: -.346 ($p = .001$; $n = 82$[30]). This implies that more experienced audit managers receive less feedback compared to less experienced audit managers. Although the explanation for the negative relationship between Experience in the auditing field and task-specific experience provided sounds reasonable, this does not imply a value judgment in terms of right or wrong. In the regulatory audit environment (see for example PCAOB, ISQC1, 2003), a tendency of increasing the importance of feedback by supervisors (including partner involvement) is observable. From Table 4.8 we cannot conclude that the increased importance of feedback and supervision has already been implemented by audit firms. Whether this finding also has an impact on the quality of the auditors' judgments is examined in section 4.4.
- The second line of Table 4.8 suggests that industry-specific experience negatively correlates with two other task-familiarity variables: task familiarity related to the identification (as measured by the number of times the tasks have been performed) of client's business risks and entity-level controls. Table 4.8 also shows that the significant correlations only relate to task-familiarity as measured in terms of 'number of times the task is performed'; the other task-familiarity measures

[29] For auditing students, these correlations are not significant.

[30] For auditing students this correlation is not significant.

(measured in terms of 'hours spent on the task') are not significantly correlated with industry-specific experience. This implies that increased industry-specific experience need not necessarily imply that the task is performed more efficiently. In fact, the opposite is true. Namely, significant positive correlations were found between industry-specific experience and the average time spent on the tasks as can be seen in Table 4.9.

Table 4.9 Pearson correlations between general experience and industry-specific experience and average time spent on the task

	Average time spent on identification of client's business risk	Average time spent on assessing impact of client's business risk on audit risk	Average time spent on identification of client's entity-level controls	Average time spent on assessing impact of client's entity-level controls on audit risk
General experience	-.160 (p=.162; n=78)	-.217* (p=.058; n=77)	-.255* (p=.024; n=79)	-.255* (p=.024; n=78)
Industry-specific experience	.387* (p=.000; n=78)	.241* (p=.035; n=77)	.152 (p=.182; n=79)	.276* (p=.015; n=78)

- Finally, Table 4.8 indicates that all task-familiarity variables are positively correlated (most of them are significant) with each other. This could provide an indication that the four tasks selected for the experiment (two of them, related to the identification of client's business risks and entity-level controls, are described in this chapter, and the other two tasks (assessing the impact of client's business risks and entity-level controls on audit risk) are described in the next chapter) are performed together by the same functional level. In addition, these correlations suggest that the various task familiarity variables measure the same construct.

Table 4.10 presents the descriptive task-familiarity statistics for auditing students.

Table 4.10 Task-specific experience of auditing students

Task	Description	N	Minimum	Maximum	Mean	Standard dev.
Identification of client business risks (CBR)	Number of times performed	20	0[31]	20	7.2	6.57
	Number of hours spent	20	0	600	101.05	158.92
	Average time spent on task	17	3.33	40	10.90	10.11
Identification of client's entity-level controls (EWC)	Number of times performed	19	0	30	9.16	8.17
	Number of hours spent	19	0	600	169.47	196.59
	Average time spent on task	17	5	40	17.96	12.15
Assessment of impact of CBR on audit risk	Number of times performed	19	0	20	7.68	6.51
	Number of hours spent	19	0	600	93.37	162.49
	Average time spent on task	17	1	40	9.51	10.70
Assessment of impact of EWC on audit risk	Number of times performed	20	0	30	8.35	8.42
	Number of hours spent	20	0	600	139.40	201.59
	Average time spent on task	16	2.5	40	13.85	11.06

From Table 4.10 it follows that on average the auditing students' group reports a relatively high task familiarity (e.g., the means of the number of times the four tasks have been performed are higher than seven). Based upon the relative novelty of the business risk audit approach and given the relative high complexity of the task (e.g. Abdolmohammadi, 1999), it was (prior to the conduction of the experiment) expected that the tasks selected in this thesis would solely be performed by audit managers. The Independent Samples t-test shows that all task familiarity-related variables measured in 'hours spent on the task' report significant differences between audit managers and auditing students. With respect to the task familiarity-related variables measured in 'number of times task performed' no significant differences are reported.

[31] Three auditing students reported they did not perform this task in the past year. Two auditing students reported they did not perform the identification of controls task last year.

In section 4.2 the main descriptive statistics of the dataset have been described. In the next paragraph, the research hypotheses (developed in Chapter 2) will be repeated in summarized form.

4.3 Research hypotheses regarding the identification task

In Chapter 2 the research hypotheses including the theoretical rationale underlying these hypotheses have been developed. The hypotheses describe the expected relationships between the auditors' judgment performance related to the identification of client's business risks and entity-level controls and the independent variables. The independent variables are concerned with the auditors' experience as well the auditors' perceived level of feedback when conducting the risk assessment task. Table 4.11 summarizes these hypotheses.

Table 4.11 Research hypotheses 'Judgment Performance related to the identification of client's business risks and client's entity-level controls

Judgment Performance related to identification of client's business risks and client's entity-level controls
1. *Judgment Performance related to general experience* The auditor's judgment performance with respect to the tasks 'identification of client's business risks' and 'identification of client's entity-level controls' correlates positively with general experience.
2. *Judgment Performance related to industry experience* The auditor's judgment performance with respect to the tasks 'identification of client's business risks', and 'identification of client's entity-level controls', and 'assessment of the impact of identified client's business risks and client's entity-level controls on audit risk' correlates positively with industry experience.
3. *Judgment Performance related to task-specific experience* The auditor's judgment performance with respect to the tasks 'identification of client's business risks', 'identification of client's entity-level controls', and 'assessment of the impact of identified client's business risks and client's entity-level controls on audit risk' correlates positively with task-specific experience.
4. *Judgment Performance related to perceived level of feedback* The auditor's judgment performance with respect to the tasks 'identification of client's business risks', and 'identification of client's entity-level controls', and 'assessment of the impact of identified client's business risks and client's entity-level controls on audit risk' correlates *positively* with feedback received from supervisors when conducting audit risk assessments.

4.4 Auditors' judgment performance related to the tasks 'identification of client's business risks' and 'identification of client's entity-level controls'

4.4.1 Introduction

Section 4.4 discusses the results of the experiment regarding the judgment performance of auditors in the identification of client's business risks as well as in the identification of client's entity-level controls. Each of the sub-sections (4.4.2 to 4.4.6) of section 4.4 will describe the results of the tests of the hypotheses as described in the previous paragraph. Sub-sections 5.4.7 and 5.4.8 describe qualitative analyses regarding judgment performance regarding the identification tasks.

4.4.2 Overall model of judgment performance and independent variables

Before starting with detailed testing of the research hypotheses by means of correlation matrices, linear regression models have been developed to examine whether and to what extent the independent variables contributed to each of four accuracy variables. Each of the four models had the following form:

Accuracy = α + β1 (general experience) + β2 (industry-specific experience) + β3 (task-specific experience) + β4 (feedback) + ε

Accuracy1

Table 4.12 Linear regression model statistics accuracy1 (=number of matching client's business risks)

Model summary						
	R		R square	Adjusted R square	Std.error of the estimate	
	.324		.105	.056	1.012	
ANOVA						
Model	Sum of squares		df	Mean square	F	Sig.
Regression	8.791		4	2.198	2.148	.083*
Residual	74.709		73	1.023		
Total	83.500		77			
Coefficients						
Model	Un-standardized coefficients		Standardized coefficients	t	Sig.	VIF
	B	Std. error	Beta			
Constant	2,992	.407		7.344	.000*	
General experience	-.014	.022	-.069	-.624	.535	1.01
Industry experience	.000	.000	.195	1.692	.095*	1.08
Task experience (idbr2)	-.005	.003	-.153	-1.359	.178	1.04
Task experience (idbm1)	-.032	.022	-.167	-1.441	.154	1.09
Feedback[32]						

Table 4.12 suggests that industry-specific experience significantly contributes to the auditor's judgment performance as measured by accuracy1. However, adjusted R square (.056) is rather low which implies that industry-specific experience to a relatively small extent explains differences in the auditor's judgment performance. In addition to Table 4.12, it was tested whether significant interaction effects were present. Based on these tests, no interaction effects were observed.

[32] When feedback is included in the linear regression model, the model is not significant. For that reason, feedback is excluded from the model.

Accuracy2

The linear regression model showed that none of the independent variables significantly contributed to judgment performance.

Accuracy3

Table 4.13 Linear regression model statistics accuracy3

Model summary						
	R		R square	Adjusted R square	Std.error of the estimate	
	.427		.182	.101	.96	
ANOVA						
Model	Sum of squares		df	Mean square	F	Sig.
Regression	14.470		7	2.067	2.230	.042*
Residual	64.876		70	.927		
Total	79.346		77			
Coefficients						
Model	Unstandardized coefficients		Standardized coefficients	t	Sig.	VIF
	B	Std.error	Beta			
Constant	3.482	.501		6.949	.000*	
General experience	.028	.024	.144	1.175	.244	1.28
Industry experience	.000	.000	.259	.194	.032*	1.19
Task experience (idbr1)	.032	.031	.170	1.032	.306	2.32
Task experience (idbr2)	-.003	.004	-.094	-.691	.492	1.59
Task experience (idbm1)	-.029	.031	.151	-.936	.353	2.24
Task experience (idbm2)	-.003	.003	-.167	-1.221	.226	1.61
Feedback	-.012	.047	.031	-.252	.802	1.26

Table 4.13 suggests that only industry-specific experience significantly contributes to the auditor's judgment performance as measured by accuracy3. For this regression model, adjusted R square (.101) is relatively low.

Accuracy 4

The linear regression model showed that none of the independent variables significantly contributed to judgment performance.

4.4.3 Judgment performance and the impact of experience in the auditing field

This section describes the tests of hypothesis 1:

The auditor's judgment performance with respect to the tasks 'identification of client's business risks' and 'identification of client's entity-level controls' correlates positively with general experience.

Table 4.14 presents the 1-tailed correlations between experience in the auditing field and the auditors' judgment performance. In the Table, two outliers (respondents with 35 and 42 years of experience, respectively) have been excluded.

Table 4.14 Pearson correlations (1-tailed) of experience in the auditing field and audit managers' judgment performance

Judgment Performance measure	**Task**	**n**	**Correlation (significance)**
Accuracy1 (number)	Identification of client's business risk	83	-.028 (.401)
Accuracy2 (importance weights)	Identification of client's business risk	83	-.093 (.201)
Accuracy3 (number)	Identification of client's entity-level controls	83	.164 (.070)*
Accuracy4 (importance weights)	Identification of client's entity-level controls	83	.013 (.454)

From Table 4.14 it follows that only accuracy3 (measuring the number of entity-level controls identified by audit managers which match with the controls identified by the expert panel) positively and significantly correlates with experience in the auditing field. Hence, hypothesis 1 is supported regarding accuracy3, but not for accuracy1, accuracy2 and accuracy4.

Table 4.14 seems to be in contrast with Table 4.1. Table 4.14 reports for audit managers a positive impact of general experience on judgment performance (accuracy3) where Table 4.1 reports that auditing students show higher mean judgment performance

related to the identification of entity-level controls. It seems hence, that the learning curve of auditors shows two peaks, one at the start of the career in auditing, and one when getting experienced in auditing. How can this be explained?
The relatively high mean judgment performance of auditing students can be explained (at least partially) by the fact that their mind-set is less framed by client-specific experiences, and is largely based on knowledge derived from textbooks in auditing and accounting information systems. For experienced auditors on the other hand, it may be possible that they experience early in their career a learning curve, in which practical experiences with actual clients need to be embedded in theoretical frameworks. When becoming more experienced, the auditor potentially gets more and more away from client-specific circumstances they were exposed to early in their careers and more and more get an overall picture of internal control systems in general paying off in higher judgment performance. It must be kept in mind however, that earlier research (e.g., Wright 1988) has produced mixed results on the effect of experience on judgment performance in general. General experience does not related to all tasks pay off and for the more complex tasks the auditor needs to get task-specific experience in order to show higher judgment performance on these tasks. Regarding the identification of controls task, the task itself is classified as relatively unstructured, but at the same time the auditor relies on prior knowledge of the client when identifying internal controls making the task – when repetitively performed – less complex.

4.4.4 Judgment performance and the impact of industry-specific experience

This section describes the tests of hypothesis 2:

The auditor's judgment performance with respect to the tasks 'identification of client's business risks', and 'identification of client's entity-level controls', and 'assessment of the impact of identified client's business risks and client's entity-level controls on audit risk' correlates positively with industry experience.

Table 4.15 presents the 1-tailed correlations between industry-specific experience and the auditors' judgment performance. In Table 4.15, one outlier (respondents with 3,000 hours of industry-specific experience) has been excluded.

Table 4.15 Pearson correlations (1-tailed) of industry-specific experience and audit managers' judgment performance

Judgment Performance measure	**Task**	**n**	**Correlation (significance)**
Accuracy1 (number)	Identification of client's business risk	84	.158 (.075)*
Accuracy2 (importance weights)	Identification of client's business risk	84	.067 (.272)
Accuracy3 (number)	Identification of client's entity-level controls	84	.195 (.038)*
Accuracy4 (importance weights)	Identification of client's entity-level controls	84	.128 (.122)

With respect to accuracy1 and accuracy3 (measuring the conformity of the client's business risk factors and entity-level controls identified with those identified by the expert panel) hypothesis 2 is supported. Both accuracy1 and accuracy3 show a positive and significant correlation with industry-specific experience. With respect to accuracy2 and 4 (measuring the conformity of the weights attached by auditors to client's business risks and entity-level controls with those attached by the expert panel) the correlations are statistically not significant. The results suggest that industry-experience to a certain extent is helpful in identifying the relevant cues (risks and controls) but is not necessarily helpful in assessing the importance of these cues. In section 4.2 significant differences between the mean levels of industry-specific experience of firm 4 compared to the other three firms were reported. However, no significant differences related to all of the four accuracy scores between audit firms were reported based on the Mann-Whitney tests.

A detailed data exploration indicated that the auditor's judgment performance showed a non-linear pattern when examined in congruence with industry-specific experience. For that reason, the population was broken down into sub-groups of more or less the same size in order to further investigate this pattern.

Table 4.16 presents the 1-tailed Pearson correlations between judgment performance and industry-specific experience:

Table 4.16 Pearson correlations between judgment performance and industry-specific experience

	Industry-specific experience (hours over past three years)				
	0	**> 0 - < 250**	**>= 250 - < 500**	**>= 500 - < 1.000**	**>= 1.000**
	n=28	n=13	n=11	n=14	n=16
Accuracy1	n.a.	.651 (.006)*	.290 (.193)	.353 (.108)	-.218 (.200)
Accuracy2	n.a.	.686 (.003)*	.136 (.345)	.312 (.139)	-.330 (.098)*
Accuracy3	n.a.	.170 (.281)	.429 (.094)*	-.182 (.266)	-.119 (.324)
Accuracy4	n.a.	.129 (.330)	-.161 (.319)	-.412 (.072)*	-.331 (.097)*

Table 4.15 presented for the population of audit managers positive and significant correlations between judgment performance and industry-specific experience with respect to accuracy 1 and 3. Table 4.16, however, shows for accuracy 1 that the sub-group of audit managers with industry-specific experience between zero and 250 hours highly contributes to the overall positive correlations and the sub-group of audit managers with more than or equal to 1,000 hours of industry-specific experience negatively contributes to this overall correlation. Additionally I have divided in two other sub-groups, namely: (1) < 1,000 hours of industry-specific experience (including respondents with zero hours of industry-specific experience, n=67), and (2) >= 1,000 hours of industry-specific experience (n=17). Table 4.17 presents the 1-tailed Pearson correlations between industry-specific experience and judgment performance for both these sub-groups.

Table 4.17 Pearson correlations between judgment performance and industry-specific experience

		Industry-specific experience	
		< 1,000 hours	**>= 1,000 hours**
Accuracy 1 (number)	Identification of client's business risk	.215 (.040)*	-.218 (.200)
Accuracy 2 (importance weights)	Identification of client's business risk	.212 (.043)*	-.330 (.098)*
Accuracy 3 (number)	Identification of client's entity-level controls	.027 (.414)	-.119 (.324)
Accuracy 4 (importance weights)	Identification of client's entity-level controls	-.052 (.339)	-.331 (.097)*

Table 4.17 suggests that for accuracy 1 and 2 (both related to the identification of client's business risk) a positive and significant correlation exists between industry-specific experience and judgment performance for audit managers with less than 1,000 hours years of experience. For audit managers with more than or equal to 1,000 hours of industry-specific experience, a negative correlation has been reported (for accuracy 2 significant, $p < .1$). For the sub-group of audit managers with less than 1,000 hours of industry-specific experience, no significant correlations have been reported between industry-specific experience and judgment performance regarding the identification of entity-level controls. These findings together suggest that industry-specific experience contributes to judgment performance in the task 'identification of client's business risk' within the period between zero and 1,000 hours and, after this period an increase of industry-specific experience is accompanied with decreased performance levels. This suggestion implies that after a certain level of industry-specific experience, the auditors' judgment performance even tends to decrease. This implies that the auditor's judgment performance does not follow a linear pattern. In order to investigate this suggestion, first a linear regression model has been developed with the following form:

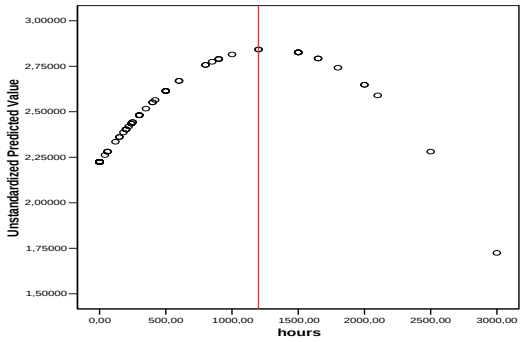
Judgment Performance (accuracy) = α (constant) + β (hours).

From the statistical results it followed that this model was not statistically significant. In order to test for non-linear patterns, another – non-linear – model was developed with the following form:

Judgment Performance (accuracy) = α (constant) + β (hours) + β $(\text{hours})^2$

This model predicts for audit managers the level of judgment performance linked to the level of industry-specific experience. Figure 4.1 presents the optimum of predicted judgment performance.

Figure 4.1 Optimum judgment performance (accuracy1) related to industry-specific experience



The model's statistics are presented in Table 4.18.

Table 4.18 Linear regression model statistics (judgment performance Accuracy1 versus industry-specific experience)

Model summary					
	R	R Square	Adjusted R Square	Std. Error of the Estimate	
	.235(a)	.055	.032	1.01319	
ANOVA					
	Sum Squares	Df	Mean Square	F	Sig.
Regression	4.928	2	2.464	2.400	.097*
Residual	84.178	82	1.027		
Total	89.106				
Coefficients					
	Unstandardized coefficients		Standardized coefficients		
	B	Std. Error	Beta	t	Sig.
Constant	2.224	.157		14.155	.000*
Hours	.001	.000	.647	2.146	.035*
Hours squared	-3.786E-07	.000	-.557	-1.849	.068*

Figure 5.1 and Table 4.18 show that up to an industry-experience level of slightly above 1,000 hours judgment performance (as measured by accuracy1) increases with an increase in industry-specific experience (steep learning curve) and from 1,000 hours or more judgment performance decreases. The regression model as a whole is statistically significant ($p < .1$) as well as the coefficients. In interpreting the practical impact to audit firms of the regression model's statistics, we need to consider that the variance in judgment variance can be explained for 5.5% by industry-specific experience. Other variables – hence – also can influence judgment performance. Taking into consideration the significance of the model, the relatively low R-square and the small margin of predictive values (approximately between 2.25 and 2.75), these results might provide an indication for audit firms to build industry-specific experience to a certain extent regarding the task 'identification of client's business risks'. Auditors' judgment performance might have benefit of a separate construction industry within the audit firm, although it might be relevant considering: (1) the need for providing opportunities to audit managers to combine industry-specific experience with audit experience in general, and / or (2) the need for rotation of audit managers over industry-specific audit clients. Regarding this second consideration, previous research studies suggested that the auditors' judgment performance can be negatively affected by increases of engagement-specific experience. E.g., Wright *et al.* (2004) concluded that experts weight client-specific information more heavily than industry information for most sub-goal judgments[33]. This does, however, not suggest that the group of audit managers with less than 1,000 hours of industry-specific experience performs better compared to the group of audit managers with more than 1,000 hours. Table 4.19 sheds light on the mean performance levels of the here distinguished two sub-groups.

Table 4.19 Mean judgment performance levels of audit managers for two sub-groups of different levels of industry-specific experience

	Means		**Levene's Test for equality of variances**		**t-test for Equality of Means**		
	<1,000 hours	**>=1,000 hours**	**F**	**Sig**	**t**	**Df**	**Sign. (2-tailed)**
Accuracy1	2.40	2.71	1.242	.268	-1.079	82	.284
Accuracy2	3.79	3.96	.136	.713	-.329	82	.743
Accuracy3	3.55	4.12	.002	.968	-2.078	82	.041*
Accuracy4	7.92	9.28	.032	.859	-1.875	82	.064*

[33] In addition, Bedard and Graham (2002) suggest that "some elements of risk knowledge included in their representations are transferable across clients (e.g., general principles of control mechanisms and effects of industry conditions), but many are client-specific. Thus, auditors with more years of experience, or even greater industry experience, are not necessarily better positioned to possess risk knowledge".

Table 4.19 presents for all judgment performance measures higher means for the group of audit managers with more than or equal to 1,000 hours of industry-specific experience compared to the group of audit managers with less than 1,000 hours of industry-specific experience. However, only the mean differences related to accuracy3 and accuracy4 significantly differ between both groups of audit managers. Integrating the findings of Tables 4.17 and 4.19, I conclude that with respect to the task 'identification of client's business risks' audit managers' judgment performance is positively affected by industry-specific experience within the first 1,000 hours of industry-specific experience and negatively affected for audit managers with more than 1,000 hours of industry-specific experience. This impact of industry-specific experience does not result in significant performance differences between the two groups of audit managers. Additionally, with respect to the task 'identification of entity-level controls' audit managers with more than 1,000 hours of industry-specific show a decreasing impact of industry-specific experience on judgment performance. For the group as a whole, however, the group audit managers with more than 1,000 hours of industry-specific experience performs significantly better on this task compared to the group audit managers with less than 1,000 hours of industry-specific experience. When considering the findings of the impact of industry-specific experience on the auditors' judgment performance for both the identification of client's business risks and client's entity-level controls, this suggests that audit firms need to consider the assignment of industry-specialized auditors to the specific tasks. Regarding the 'identification of client's business risk' task, audit firms need to consider the potential for more task rotation amongst audit managers experienced in the construction industry in order to benefit from learning patterns and to remain skeptical towards the task resulting in more task efficiency and task effectiveness. Regarding the identification of client's entity-level controls task, there is less need for assigning industry-specialists to this task.

4.4.5 Judgment performance and the impact of task-specific experience

This section describes the tests of hypothesis 1: "Audit managers' Judgment Performance regarding the tasks 'identification of client's business risks' and 'identification of client's entity-level controls' correlates *positively* with *task-specific* Experience". Task-specific experience has been measured by asking participants to provide their best estimate of the number of times they performed last year the tasks 'identification of client's business risks' and 'identification of entity-level controls' (resulting in the variables IDBR1 and IDBM1, respectively) as well es their best estimate of the summed hours spent on these tasks (resulting in the variables IDBR2 and IDBM2 respectively).

Table 4.20 presents the 2-tailed correlations between task-specific experience and the audit managers' judgment performance. In the table, two outliers (respondents reporting having performed the task 'identification of client's business risk 50 times a year, or reporting 500 hours spent on the identification of client's entity-level controls) have been excluded.

Table 4.20 Pearson correlations between judgment performance and task-specific experience of audit managers

	2-tailed Pearson Correlation (significance)			
Judgment Performance measure	IDBR1 No of times task identification client's business risk performed n=82	IDBR2 No of hours spent on task identification client's business risk n=82	IDBM1 No of times task identification of client's entity-level controls performed n=83	IDBM2 No of hours spent on task identification client's entity-level controls n=83
Accuracy1	-.178 (.109)	-.163 (.144)	-.252* (.022)	-.151 (.172)
Accuracy2	-.050 (.657)	-.119 (.289)	-.126 (.257)	-.073 (.512)
Accuracy3	.071 (.525)	-.066 (.555)	-.152 (.171)	-.256* (.020)
Accuracy4	.065 (.563)	-.033 (.976)	-.027 (.811)	-.086 (.441)

Table 4.20 shows for accuracy1 (related to the task 'identification of client's business risks) a negative (not significant) correlation with task-specific experience. Further, Table 4.20 shows a significant negative correlation between accuracy1 (accuracy3) and task-specific experience as measured by IDBM1 (IDBM2). As a result hypothesis 3 is rejected. This finding is inconsistent with Bonner (1990). Bonner reported that task-specific knowledge related to cue selection (i.e., selection is a sort of proxy for the identification tasks) results in increased judgment performance in an analytical risk assessment task, but does not result in increased judgment performance in a control risk assessment task. Future research should be directed towards exploration of the reasons behind the lacking positive association between judgment performance and task-specific experience. Specifically related to the identification of client's business risks it is imaginable that each company faces its own engagement-specific business risks. Auditors performing more often the identification task or spending more hours on the task can develop a biased mind-set. This potential bias could probably result in relatively lower judgment performance and auditors with more client-specific experience become to a lesser extent sensitive for alternative cues. It is recommended that this avenue for future research also takes into account whether, and if so, to what extent decision-aids

(e.g., industry-specific templates with respect to business models including business risks) result in increased judgment performance. Recently, Kotchetova (2002) investigated whether the analysis of client strategy content or strategy process was associated with more accurate (inherent and control) risk assessments. The empirical results supported this hypothesis, although the variability of the risk assessments did not decrease, probably due to a relatively large number of cues. One might indeed assume that a large number of cues require a clear focus on the most important cues. The more experienced auditors experience more difficulty in the selection process. Additionally, the questionnaire used in the experiment requested participants not to make use of any reference material or decision aid. The empirical results could have shown to be different from the results presented here, if the participants had made use of e.g. industry-specific templates[34].

Table 4.21 presents the 1-tailed correlations between task-specific experience and the auditing students' judgment performance. In the Table, one outlier (respondent reporting having spent 600 hours on the task 'identification of client's entity-level controls') has been excluded.

Table 4.21 Pearson correlations between judgment performance and task-specific experience of auditing students

Judgment Performance measure	**n**	**1-tailed Pearson Correlation (significance)**			
		IDBR1 No of times task identification client's business risk performed	IDBR2 No of hours spent on task identification client's business risk	IDBM1 No of times task identification of client's entity-level controls performed	IDBM2 No of hours spent on task identification client's entity-level controls
Accuracy1	19	.057 (.408)	.029 (.453)	.176 (.242)	.351 (.077)*
Accuracy2	19	-.109 (328)	-.011 (.482)	.012 (.481)	.156 (.268)
Accuracy3	19	.234 (.168)	.201 (.204)	.340 (.084)*	.291 (.120)
Accuracy4	19	.012 (.481)	.132 (.295)	.099 (.348)	.190 (.225)

Table 4.21 shows predominantly positive correlations between judgment performance and task-specific experience for the group of auditing students. This contrasts with the

[34] Of the 85 audit managers, 34 (i.e., 40%) indicated that they would have used a decision aid if one should have been available. Some respondents mentioned 'sparring with colleagues', other respondents mentioned the aid of templates.

predominantly negative correlations reported for audit managers (Table 4.20). The significant correlation (correlation of .351; significance 7.7%) between judgment performance related to accuracy 1 (the identification of client's business risks) and IDBM2 (this task-specific experience variable relates to the identification of client's entity-level controls) is remarkable. This might be explained by the fact that auditing students already gained some experience in the auditing practice. This type of experience potentially implies that auditing students learn from their experience with other audit clients, i.e. auditing students' knowledge base is relatively easily transferable to other audit clients. For audit managers, the learning curve regarding the identification of entity-level controls is assumed to be less steep. Task-specific experience as measured by the number of hours spent on the task 'identification of client's entity-level controls' significantly and positively correlates with task-specific experience variables IDBR2 (number of hours spent on identification of client's business risks; 1-tailed Pearson correlation .523; significance 1.3%) and IDBM1 (number of times the task 'identification of entity-level controls' has been performed; 1-tailed Pearson correlation .727; significance 0%). The positive correlation between judgment performance as measured by accuracy1 and task-specific experience as measured by IDBM2 suggests that auditing students spending more time on identification of entity-level controls identify more accurately client's business risks. The two tasks, although distinguished from each other, are closely connected. Indeed, in the identification of entity-level controls the auditor will be looking for those controls which are most effective in mitigating client's business risks. This suggests that if auditors spend more hours on the identification of entity-level controls, this will also benefit the accuracy of identification of client's business risk (transferable knowledge across tasks).

Regarding judgment performance as measured by accuracy3 a significant and positive correlation has been reported in Table 4.21 with task-specific experience as measured by IDBM1 (the number of times the auditor performs the task 'identification of entity-level controls'). For this correlation, hypothesis 3 (judgment performance is positively correlated with task-specific experience) has been supported. As audit managers performed the task 'identification of entity-level controls' an equal number of times (i.e., 9) compared to auditing students, the positive correlation between judgment performance and task-specific experience for auditing students suggests that auditing students experience relatively higher learning effects compared to audit managers (transferable knowledge across clients).

4.4.6 Judgment performance and the impact of the 'perceived level of feedback when conducting risk assessments tasks'

This section describes the tests of hypothesis 2 (refer to paragraph 4.3). Hypothesis 4 is stated as follows:

Judgment Performance with respect to the tasks 'identification of client's business risks' and 'identification of client's entity-level controls' correlates *positively* with feedback received from supervisors when conducting audit risk assessments.

This hypothesized positive correlation is based on the assumption that providing auditors with feedback will result in increased learning effects. Supervision, by means of feedback, is meant to monitor the learning process of an auditor and adjust the auditors' judgment process when judgment errors are identified.

Participants in the experiment have been requested to indicate how often they receive feedback from their superiors when conducting a risk assessment task. The 11-point response scale ranged from zero (sometimes) to ten (often). The 11-point response scale ranged from zero (little/not much) to ten (much).

Table 4.22 presents descriptive statistics related to the variables 'feedback'.

Table 4.22 Descriptive statistics related to 'feedback'

	Means
	Feedback
Audit managers (n=84)	5.274
Auditing students (n=20)	6.800

Independent samples test

		Levene's test for equality of variances		**t-test for equality of means**		
		F	sign	t	df	sign
Feedback	Equal variances assumed	.594	.443	-2.295	102	.024*
	Equal variances not assumed			-2.410	30.527	.022*

From Table 4.22 it can be noted that audit managers significantly perceive to receive less feedback from their supervisors when conducting risk assessments compared to auditing students. From a practical perspective, the (significant) mean difference between audit managers and auditing students related to feedback is not surprising. Auditing students/auditing staff receive in audit practice more direct supervision compared to audit managers. From a regulatory perspective, the PCAOB has recently issued new guidance regarding documentation requirements. These documentation requirements are also related to ensuring a high (and visible) level of audit quality (e.g. PCAOB Auditing Standard No.2, sections 119 and 125, 2004). Another example is PCAOB Auditing Standard No.3 (2004) that deals with the quality of audit documentation. AS 3 states on page 3: "In addition to providing the basis for the conclusions in the auditors' report, audit documentation facilitates the planning, performance, and supervision of the engagement and provides the basis for the review of the quality of the work by providing the reviewer with written documentation of the evidence supporting the auditors' significant conclusions". As our experiment has been conducted prior to the issuance of AS 3, it can be concluded that prior to 2004 the quality of audit documentation, and hence the adequacy of supervision, left room for improvement. Page A1-4 additionally states that: "audit documentation must contain sufficient information to enable an experienced auditor, having no previous connection with the engagement: (a) to understand the timing, nature, extent and results of the procedures performed, evidence obtained, and conclusions reached and (b) to determine who performed the work and the date such work was completed as well as the person who reviewed the work and the date of such review". Each document in the audit file, hence, needs to be undersigned by two persons: one signature of the person who performed the work, and one signature of the person who reviewed the work. As many engagements are performed under time pressure, particularly nearly the completion of the audit, and audit managers become more involved with the completion of the audit, it is hence expected that audit managers perceive lower levels of review by their audit partner compared to auditing students. Interestingly, AS 3 connects the quality of documentation (including the quality of supervision/review) directly with audit quality. Higher levels of judgment performance, thus, can be expected when more review of the work performed takes place.

Further analysis of the perceived level of feedback was directed towards potential differences across firms since feedback can be an element of a company's culture and/or company policy. Table 4.23 shows the mean perceived levels of feedback for audit managers across audit firms.

Table 4.23 Audit firm means of perceived feedback

	Feedback	n
Firm 1	3.84	19
Firm 2	4.96	26
Firm 3	6.04	23
Firm 4	6.38	16
Sum		84

The perceived level of feedback, based upon the Scheffé multiple post hoc comparison, differs significantly between firm 1 and firm 3 (p = .064) and between firm 1 and firm 4 (p = .047). As previously discussed new auditing standards (see also ISA 200, sections 18 and 22, 2003) require significant attention of audit firms regarding implementation of adequate supervision and review procedures. Based upon Table 4.23, it is suggested that particularly audit firm 1 is required to align internal feedback procedures with the new international auditing standards.

Table 4.24 presents the 1-tailed correlations between the perceived levels of feedback and the audit managers' judgment performance. This Table excludes outliers as described in previous sections.

Table 4.24 Pearson correlations between the perceived levels of feedback and judgment performance

Group	Judgment performance	n	Feedback
Audit managers	Accuracy 1	84	-.032 (.387)
	Accuracy 2	84	-.036 (.371)
	Accuracy 3	84	-.055 (.308)
	Accuracy 4	84	.099 (.186)
Auditing students	Accuracy 1	20	-.199 (.201)
	Accuracy 2	20	.109 (.323)
	Accuracy 3	20	-.044 (.427)
	Accuracy 4	20	.106 (.328)

From Table 4.24 follows that hypothesis 4 is not supported. As a result, we cannot conclude that higher perceived levels of feedback contribute to increased judgment performance. From the dataset no unambiguous explanations for the results reported are at hand. However, from existing research literature it is known that variables, other than 'feedback' contribute to increased judgment performance. E.g., the identification tasks examined in this thesis are performed by auditors individually. Bedard and Maroney (2002) argue that, specifically for idea generation tasks, judgment performance might be improved by group decision-making when compared to individual decision-making. Additionally, audit firm's audit manuals often provide required or emphasized use of decision aids. The decision aids as another explaining factor influence judgment performance. E.g., a positive contribution of the required use of a specific template to judgment performance might be expected if the template to be used is based on (standardized) business practices (e.g., Kotchetova, 2002). A standardized checklist, for example, will be helpful in mitigating blind spots in individual auditors' judgment and decision-making in that the individual auditor is obliged to check the presence of a pre-defined list of risk factors.
Regarding the impact of the level of feedback on judgment performance we suggest that future research needs to define the variable 'feedback' in more clear terms. As described above, AS 3 (PCAOB, 2004) requires a high quality audit documentation including visible and dated sign-off of audit documentation by reviewers. However, AS 3 at the same time prescribes that review notes need to be cleared from the audit files prior to the report release date (PCAOB, 2004, p.5). Although this requirement will result probably in more transparent audit files, review notes (including feedback of supervisors to those performed the task under review) will additional function as juridical evidence that a task has been reviewed by a supervisor. Feedback hence, needs to be distinguished into oral feedback, and (informal, not part of the audit files, and formal) written review notes. This distinction will clarify more about the content of feedback provided to those performing audit tasks.

The sections 4.4.2 to 4.4.6 described the quantitative analyses and tests of the hypotheses related to the identification of client's business risks and entity-level controls. The next sub-section (4.4.7) provides qualitative analyses of the nature of the client's business risks identified by auditors. The subsequently following sub-section (5.4.8) provides qualitative analyses of the nature of the client's entity-level controls identified by auditors.

These topics are of particular interest given the relative novelty of the business risk audit approach and the absence of a worldwide or nation-wide accepted framework for the identification of client business risks.

4.4.7 ***Exploration of the type of client business risks identified by auditors***

Typically, client business risks are divided into two subcategories, strategic risks and operational risks (e.g. Knechel, 2001)[35]. This distinction has been derived from existing text-books on auditing (e.g., Knechel, 2001). Strategic risks comprise a combination of risks resulting from (external) industry forces and the strategy implemented by a company (e.g. Knechel, 2001, p.137). Operational risks are business risks related to the realization of a company's objectives, which can be linked to (internal) activities within the organization (e.g. Knechel, 2001, p.137, 195). Bell *et al.* (1997, p.1) argue that "knowledge about the nature of the client's business activities and related business risks, its organizational structure and internal environment, and its relationships and interactions with its external environment, provides a basis for the auditors' evaluation of whether financial-statement assertions are valid. In today's complex and dynamic economic world, obtaining this knowledge is a formidable undertaking. It entails identifying, collecting, and processing a wealth of information about the client's business and industry that may be relevant for the audit. And, more importantly, it entails integrating this information to form a "whole-system" representation of how the client organization fits within the broader economic environment, and how effectively its key business processes, working in combination, maintain or strengthen that fit". Hence, both strategic and operational business risks are of major importance in the business risk audit approach.

From the questionnaires, a list of risk factors identified by auditors has been developed. This list of risk factors is shown in Appendix C. The entire list was reviewed by three individual persons, each of them individually classifying each risk as either a strategic business risk or an operational business risk. After three discussion sessions with these persons, 100% consensus was reached on the final classification of the business risks. Subsequently, the final classification was entered in SPSS as two separate variables.

[35] Others categorize business risks into operational, financial and compliance risks (e.g. Bell et al., 1997, p.35). Other classifications are – thus – possible as well.

The analysis of the classification of client business risks consists of two parts. Firstly, we analyzed this classification for the entire list of client business risks identified by respondents. This analysis will gain insight into the focus of the nature of risk factors (whether these risk factors attribute to judgment performance or not) in the identification process. Secondly, we analyzed whether the impact of the classification on judgment performance of audit managers and auditing students.

Analysis of risk identification process

Table 4.25 summarizes a comparison of the number of operational and strategic business risks identified by audit managers and auditing students.

Table 4.25 Summary number of operational and strategic business risks identified

	Operational risks			**Strategic risks**		
	Number	*%*	*Mean number per respondent*	*Number*	*%*	*Mean number per respondent*
Audit managers	237	57.66	2.79	174	42.34	2.05
Auditing students	44	45.36	2.20	53	54.64	2.65

From Table 4.25 follows that audit managers identified relatively more operational risks compared to the number of strategic risks. For auditing students opposite results are reported, auditing students identifying relatively more strategic risks than operational risks. These differences are significant, according to the Mann-Whitney test (for operational risks: p-value = .019; for strategic risks: p-value = .029).
An analysis of the nature of the dataset of risk factors revealed differences in identification of strategic risks related to:

- “Absence of formalized strategy” (identified by 75% of auditing students and 25% of audit managers);
- “Changes in the demand for the projects/services” (identified by 25% of auditing students and 14% of audit managers);
- “Magnitude of work at hand” (identified by 24 audit managers; 0 auditing students) and “financial position” (21 audit managers; 1 auditing student).

An analysis of the nature of the dataset of risk factors revealed differences in identification of operational risks related to:

- "Risk of calculation errors" (identified by 28% of the audit managers and 20% of the auditing students);
- "Risk of absent reconciliation between finance administration and management information related to projects" (identified by 20 audit managers and by 3 auditing students).

These differences between audit managers and auditing students in the nature of risks identified underline that auditing students have been relatively more focused on strategic risks and audit managers have been relatively more focused on operational risks. In the next section, it is examined whether and if so, to what extent this different focus also explains differences in judgment performance between audit managers and auditing students.

Analysis of risk classification versus judgment performance

The previous section was concerned with the identification process *as such*, i.e., the identification process including both risk factors matching and not matching with the expert panel. The current section deals with the *quality* of the identification process, i.e., it is focused on the identification process related to only risk factors which matched with the expert panel. Indeed, the accuracy-scores calculation included only those risk factors that matched with the expert panel. In order to analyze the judgment performance of auditors related to strategic and operational business risks, the original accuracy1-score was decomposed in risk factor components, e.g. an accuracy1-score of 5 was decomposed into 5 accuracy1-scores each with the value of 1. The same decomposition has been performed for accuracy2. The number of risks (identified by respondents) matching with the expert panel's identified risks (i.e. accuracy1) is presented below:

Table 4.26 Summary number of strategic and operational business risks matching with the expert panel (accuracy1)

	Operational risks			**Strategic risks**		
	Number	*%*	*Mean number per respondent*	*Number*	*%*	*Mean number per respondent*
Audit managers	148	70.81	1.74	61	29.19	0.72
Auditing students	26	63.41	1.30	15	36.59	0.75

These differences are, according to the Mann-Whitney test, only significant for operational risks (p = .098) (p-value for strategic risks = .677). A comparison of the identification process as such (Table 4.25) and the quality of the auditors' identification process (Table 4.26) result in the following conclusions:

- For audit managers it was found that they identified more operational risks compared to strategic risks (a number of 237 operational risks versus 174 strategic risks, see Table 4.25). In addition, it was found that operational risks attributed more to judgment performance compared to the attribution of strategic risks to judgment performance (a number of 148 operational risks versus 61 strategic risks attributed to judgment performance). Compared to auditing students, audit managers identified more relevant risk factors as a whole. Audit managers' judgment performance was primarily influenced by operational risk factors. These results suggest that audit managers have most learning opportunities with respect to the identification of important strategic risks[36].
- For auditing students it was found that they identified more strategic risks compared to operational risks (a number of 53 strategic risks versus 44 operational risks). However, the identified operational risks attributed more to their judgment performance compared to the strategic risks (a number of 26 operational risks versus 15 strategic risks). These results suggest that auditing students have most learning opportunities in selecting the appropriate (i.e. those risks matching with the expert panel) most important strategic risks[37].

36 ISA 315 (e.g., ISA 315: Appendix 1, IFAC, 2003) provides examples of the relevance of client's business risks due to the client's strategy and objective setting process in relationship with the accounting requirements and - thus - the financial statements.

37 ISA 315 (e.g., ISA 315: Appendix 1, IFAC, 2003) provides examples of the relevance of client's business risks due to the client's business operations.

The results give rise to interesting questions regarding the audit profession. Particularly, it is of interest how these results translate to actual client settings. One of the most important issues is whether the auditor adequately identifies the most important risk factors present in the audit environment. ISA 315 (IFAC, section 31, 2003) explicitly states that the auditor does not have the responsibility to identify or assess all business risks. However, the auditor is required to identify significant risks (i.e., risks that requires special audit consideration) affecting the financial statements (ISA 315, IFAC, section 108 and following, 2003). From previous literature (e.g., Kotchetova, 2002) it has been suggested that decision aids might be helpful in addressing this issue. A related question is concerned with the focus of the identification of business risks. From a psychological perspective it is known that human beings share the characteristic of 'bounded rationality' (e.g. Choy and King, 2003; Conlisk, 1996; Cooksey, 1995). That is to say that they are limited in processing lots of cues into judgment and decision-making. Prior studies (e.g. Shanteau, 2002) have shown that both experts and novices make use of only a few cues. This thesis also suggests a need for more focus on a limited number of relevant risk factors. Indeed, audit managers as well as auditing students have obviously missed risk factors which the expert panel deemed most important, and additionally have identified risk factors which the expert panel did not identify. This does not mean that the identified risk factors not matching with the expert panel's list of risk factors, were not important at all, but probably respondents put relatively too much weight on (according to the expert panel) less relevant risk factors. Given the recently issued international auditing standards (ISAs 200, 315, 330, and 550 as well as PCAOB-standards AS1, AS2, AS3, and AS4) and other available international guidance (e.g., updated COSO-ERM framework) it is expected that specific audit firms will continue with adjusting and focusing audit approaches to those issues that requires significant consideration during the financial statement audit. Specifically for audit firms who also provide attest services regarding internal control as a result of the issuance of the Sarbanes Oxley Act (2002) section 404, auditors' judgment process may benefit from improved risk analyses prepared by the audit clients. Given the accounting scandals published in previous years, audit firms have raised 'Audit Quality' to one of the most important strategic themes, which implies that currently audit firms invest significant amounts of money in the audit firm's quality and judgment processes of individual auditors. In addition, it is expected that the recently issued audit documentation standards (ISA 500, 2003; PCAOB, AS3, 2004) combined with more institutionalization of group judgment processes (e.g.: team planning events, post-interim events, wrap-up events) and establishment of independent reviewers will result in increased judgment performance and audit quality.

Related to accuracy2 (which includes judgment performance regarding the importance weights the respondents attached to each of the identified risk factors) the results are given in Table 4.27:

Table 4.27 Summary number of strategic and operational business risks matching with the expert panel (accuracy2)

	Operational risks			**Strategic risks**		
	Importance points	*%*	*Mean importance points per respondent*	*Importance points*	*%*	*Mean importance points per respondent*
Audit managers	232.64	71.66%	2.74	92	28.34%	1.08
Auditing students	50.31	71.81%	2.52	19.75	28.19%	0.99

These results are comparable with the results presented in Table 4.26 and, hence, are not further amplified.

Description of the nature of identified client business risks

This section is concerned with the nature of identified client business risks. In the previous section, some differences between audit managers and auditing students in the outcomes of the identification task have already been reported. The description of these differences, however, was primarily concerned with the distinction between strategic and operational client business risks. In order to find a norm with which the judgment performance of auditors could be compared, the accuracy-scores were used (i.e., the panel of expert auditors was used as benchmark). The remaining analyses of the nature of identified client business risks in the current section starts with a description of the client business risks deemed most important by audit managers and auditing students. This provides additional insight, compared to the analysis of operational and strategic risks, into the nature of risks identified. Subsequently, a comparison will be made with published business risks for the construction industry in The Netherlands. This comparison contributes to our insight into potential differences between auditors' risk perceptions and audit client's risk perceptions. Due to differences in methodology between this industry-specific publication and this thesis, the analysis will be high-level and qualitative by nature.

Business risk factors deemed most important

The identification task of audit managers and auditing students resulted in a list of 35 distinguished risk factors (see Appendix A). Ranking the list of risk factors by the number of times an audit manager identified a business risk, results in the following top five of business risks:

1 The risk of formalization of adjustments to original contract-specifications (variation status list) (n = 25);
2 Risks due to the number of projects in the order book (work at hand) (n = 24);
3 The risk of project losses (n = 24);
4 The risk of calculation errors in the tender phase (n = 24);
5 Risks due to the relatively low number of principals (n = 23).

The top-five of auditing students is composed as follows:

1 Risks due to the absence of a formalized strategy (n = 15);
2 The risk of formalization of adjustments to original contract-specifications (variation status list) (n = 9);
3 Compliance risks with respect to rules and regulations (e.g., environmental rules, safety rules etc.) (n=9);
4 Risks resulting from fixed fee contracts; this has a consequence that price-increases cannot be charged to the principal (n = 7);
5 Risks due to the relatively low number of principals (n = 6).

A comparison of both lists of the top five business risks resulted in the following findings:

- Regarding the top five of client's business risks identified by audit managers, it is notable that more or less the same number of auditors (between 23 and 25 auditors) identified these risks. For the group of auditing students, n ranges from 6 to 15. This difference is probably a consequence of the relatively small population of auditing students (n = 20).
- Audit managers and auditing students seem to share only two out of the sum of eight risk factors. This finding is less striking than it seems to be. If the presented list of risk factors had been enlarged to the top eight of risk factors, the lists of audit managers and auditing students would become comparable. However, one business risk factor (i.e., risks due to the number of projects in the order book) is not identified by any student. This might be explained by the fact that the wordings of business risks were not pre-defined in the questionnaire, but were left free to the respondent. As can be seen in the presented list of auditing students' risk factors, six auditing students identified the risks due to the relatively low number of

principals. It could be argued that this risk is related to the risk regarding the order book. We conclude that the list of mostly identified business risks of audit managers and auditing students does not differ very much.

Reviewing of the lists provided above raises the question whether these really are business risks a corporate director of a construction-company is really worrying about. We will elaborate more about this question in the next section.

A comparison of risks identified by auditors and published risk factors

In this section, risk factors identified by auditors will be compared by risk factors which are generally applicable to construction companies. Risk factors generally applicable to construction companies have been derived from a recent publication in The Netherlands of the Stichting Bouwresearch (further: the foundation). The foundation assists the construction and real estate-industry in the prevention and solution of bottlenecks with respect to the application of new insights and developments aimed at the improvement of quality, productivity, working circumstances and opportunities for employment in this industry. The foundation published guidance with respect to risk management for small and medium-sized construction firms some time before (2000) the questionnaire underlying this thesis was distributed. Risk-management is defined in this context as: “recognition and controlling of risks and uncertainties during the realization of projects in order to increase the chance of successfulness of the project”. This publication categorizes the most important risks along the phases of a project: (1) risks in the tender- and negotiation phase, (2) risks in the project-preparation phase, (3) risks during the execution of a project, and (4) risks in the project-completion phase. The essence of each of these phases as well as a comparison of the risks published by the foundation and the risks identified by audit managers is presented in Table 4.28:

Table 4.28 Risk comparison: generally applicable risks as published versus risks identified by auditors in experiment

Project-phase	Generally applicable risks as published (summarized)	Risks identified by auditors in experiment (summarized)	n
Tender- and negotiation	Assessment of costs too low	Calculation errors	24
		Fixed fee contracts	17
		Risk of project-losses	24
		Risks due to price-competition	15
	Vagueness of project specifications and descriptions	Calculation errors	24
		Fixed fee contracts	17
		Risk of project-losses	24
	Project-duration estimated too short	Calculation errors	24
Project preparation	Starting too soon (e.g. insufficient project information received from principal; insufficient project information to and from sub-contractors and suppliers; planning insufficient).	Calculation errors	24
		Fixed fee contracts	17
		Risk of project-losses	24
		Internal communication (not one-to-one match)	3
	Construction method insufficiently considered	Not identified	
	Project-location too small (e.g. crowded city)	Not identified	
Project execution	Speed of execution behind planning	Risk of project-losses	24
		Internal communication (not one-to-one-match)	3
		Quality of personnel	7
		Exit of key personnel	8
	Quality of sub-contractors and suppliers (e.g. compliance to contract)	Contacts with suppliers and sub-contractors	4
	Risk of theft, vandalism etc.	Risk of project-losses	24
	Risks due to weather	Risk of project-losses	24
	Late invoicing of installments to principal	Late invoicing of installments to principal	15
	Absence of personnel due to illness	Risk of project-losses	24
		Compliance to rules and regulations regarding working environment	21
Project completion	Discussions about deviations of original contract (variation status list)	Fixed fee contracts	17
		Risk of project-losses	24
		Internal communication (not one-to-one match)	3
		Discussions about deviations of original contract (variation status list)	25
		Completeness of invoicing variation status list	21
	Risk of timeliness payments by principal	Debtor risks	14

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Qualitative analysis of this comparison gives rise to the following remarks.

Firstly, risks reported by the foundation are merely project-related. E.g., external threats or risks resulting from the strategy formulated by the construction company are not described. Although the theme 'business risks resulting from the strategy chosen by the construction company' was not part of the foundation's research question, it is important to note that strategy and objective-setting can result in significant business risks (see also ISA 315, Appendix 1, 2003). Risks identified by audit managers on the other hand are not specifically focused on those business risks that result from specific construction projects but cover a broader area. For example, audit managers identified the following risks which have not been identified by the foundation: risks due to insufficient innovation, risks due to the competitive position (e.g. potential of new entrants to the marketplace), dominant position of the general manager, internal information-related risks (incomplete management information), a limited number of principals and risks due to the composition and completeness of the order book and risks related to the financial position of the company. Given the relatively high number of audit managers identifying these risks, it can be concluded that risk identification by audit managers in general comprises a spectrum of risks which is broader than just the project-related risks.

Secondly, a relatively high number of audit managers identified risks in the tender/negotiation-phase. This could probably be an indication that the business risk audit approach results in early identification of business risks in order to get a broader understanding of the client's business. This probably implies the recognition by audit managers that early recognition of business risks is important to understanding the causes underlying the establishment of project results (work-in-progress). Based upon risk identification prior to or from the start of the project, the auditor might be better able to formulate knowledge-laden expectations (Bell *et al.*, 1997; Knechel, 2001) on material financial statement accounts. For example, auditors identified the risk of 'calculation errors' in the tender and negotiation phase of a project. When auditors have analyzed the impact of this risk, auditors formulate hypotheses regarding the error sensitivity of the entire calculation process. Should the risk only have impact on one specific project, the auditor will focus attention on this specific project and will subsequently assess the risk of a material loss for that specific project due to calculation errors and communicate with the audit client whether and to what extent this risk is mitigated by internal controls. At year-end, the auditor will also perform analytical procedures regarding the account balance of work-in-progress with specific attention to a potential loss provision for the project that required specific consideration (i.e., when conducting analytical procedures,

the auditor develops knowledge-laden expectations as to the development of specific account balances).

Thirdly, it is clear from Table 4.28 (see highlighted cells) that audit managers did not identify two risks which have been identified by the Foundation of Construction research (namely: 1. Construction-method insufficiently considered and 2. Project-location too small (e.g., crowded city)). Does this finding suggest that business risks in this project phase bear less relevance to the financial statement audit? This could probably be the case. E.g. risks due to insufficient consideration of construction method are highly technical by nature. Obviously, auditors do not possess skills to evaluate such considerations and to evaluate the financial impact of alternative constructions. This does, by the way, not necessarily imply that risks in the project-preparation-phase can be fully neglected in the financial statement audit. Sooner or later, this kind of risks (if they exist) will become visible in the valuation of Work-in-Progress (overrun in budgeted costs and probably resulting in a provision for losses). On the other hand, research literature (e.g. Eilifsen *et al.*, 2001) suggests that the business risk audit approach involves the assignment of more specialists to the audit team. For the case-setting in the experiment, auditors did not identify the before mentioned risk and are probably unaware of the need for adding specialists to the team.

Finally, and in addition to the previous remarks, risks identified by audit managers are clearly linked to the client's accounting system. Table 4.28 includes only the risk factors identified by auditors if they matched with the risk factors identified by the foundation. However, auditors identified also factors additional to the factors described in Table 4.28. Auditors identifying client's business risks direct their attention, more than is shown in the foundation's report, to those risks which are also of relevance to the financial statements. Examples of "accounting" risks include the following: shifts in recording costs to other projects, the accounting organization and the system of internal controls as a whole, debtor risks (related to debtor valuation), late invoicing of installments (resulting in a relatively high value of Work-in-Progress), analysis of hours worked (timesheet administration), and the linkage between the finance administration and management information (information risks).

4.4.8 Exploration into the nature of entity-level controls identified by auditors

This section is concerned with the nature of identified client entity-level controls. In the previous section, some differences between audit managers and auditing students in the outcomes of the identification task were already reported.

Entity-level controls deemed most important

In total, the identification task of audit managers and auditing students resulted in a list of 27 entity-level controls (see Appendix B). Ranking the list of risk factors by the number of times an audit manager identified a client's entity-level control, results in the following top five of client's entity-level control:

1 Project progress management's report / project-controlling (n = 62);
2 Comparison of ex ante project-calculations with ex-post calculations/project evaluations (n = 40);
3 Budget procedures (general costs, 'AK') (n = 37);
4 Segregation of duties (n = 35);
5 Compliance to rules and regulations, code of conduct (n = 29).

The top-five of auditing students is composed as follows:

1 Project progress management's report / project-controlling (n = 14);
2 Comparison of ex ante project-calculations with ex-post calculations/project evaluations (n = 12);
3 Budget procedures (general costs, 'AK') (n = 9);
4 Project-administration in place and reconciled to the finance administration (n = 9);
5 Compliance to rules and regulations, code of conduct (n = 7).

A comparison of both lists of the top five of entity-level controls resulted in the following findings:

- Audit managers and auditing students seemingly view the top-five of entity-level control equally important. This suggests that differences in judgment performance regarding the identification of entity-level controls are more attributable to other controls (below the top-five). One obvious difference is related to the control 'deviations of original contract procedures') (n audit managers = 23; n auditing students = 2). This type of control obviously relates to the client's business risks 'Risk of absence of monitoring the completeness of the variation status list' and 'Risk of discussions regarding variation status list due to insufficient formalization of project variations'. One of the reasons explaining the finding that students did not identify the control 'deviations of original contract..' could be that they identified

compensating controls. E.g. the identification of the control ‘Project-administration in place and reconciled to the finance administration’ could mitigate the previously described client’s business risks by separately coding variations in the project administration (e.g. coding of separate project labels in order to monitor the timely invoicing of project variations). Another example would be the existence of reliable management information. In case the project progress report provides an early warning of unexpected losses or higher than budgeted costs, making visible that some corrective action (like formalization of procedures related to project variations) would be required.

- Both audit managers and auditing students recognized the control ‘compliance to rules and regulations/code of conduct’ nearly equally important. Probably, this control has gained in recent years more and more importance. Amongst other things, codes of conduct became more important due to the scandals related to financial reporting. As a result, there has been a call for more emphasis on the themes ‘corporate integrity’ and ‘tone at the top’ (e.g. SOX-404, 2002, Code Tabaksblatt, 2003). Non-compliance with rules and regulations might result in negative publicity and even in fines. Hence, the responsibility of the board of directors for reliable financial reporting has received much attention in laws, rules and regulations. From an agency perspective, the principal (e.g. investors) might put a premium on the expected rate of return for companies who received negative publicity. For registered companies, this might be a very important business risk, which is directly related to the financial statements (reliability of financial reporting). Or, more properly formulated, the existence of a code of conduct is, from an agency perspective, a pre-requisite for being ‘in control’. In addition, at the time of the experiment, ‘compliance’ was a hot issue as a result of the parliamentary investigation regarding fraud in the construction industry. Although this investigation was not specifically addressed in the case description used in the experiment and the questionnaire did not provide hints in this direction, it might indeed be the case that participants have used their general knowledge in the identification of compliance controls.
- It should also be noted that a relatively low number of audit managers (i.e. 1) and auditing students (i.e. 3) identified controls related to the formalization of corporate strategy. Recently, ERM (2004) has been published putting more emphasis on the process of setting strategic objectives which, according to ERM (2004), involves a more direct relationship with the corporate control ‘risk analysis’ (this COSO-component has been identified by 1 audit manager and has not been identified by any of the auditing students). This finding might be explained by the size of the company described in the case-setting, i.e. a medium-sized company. For

relatively small companies, this control might be viewed as too bureaucratic. However, at the same time audit managers as well as auditing students identified the absence of a formalized strategy as an important client's business risk (21 audit managers; 15 auditing students).

4.5 Summary of empirical results related to the auditors' identification of client's business risks and entity-level controls

Chapter 4 describes the empirical results regarding the auditors' judgment performance regarding the tasks 'identification of client's business risks' and 'identification of the client's entity-level controls'.

Limited support has been found for the hypothesis expecting a positive impact of *general experience in the auditing field* on judgment performance. This hypothesis was only supported for the auditors' judgment performance regarding the identification of entity-level controls as measured by accuracy3 (measuring those entity-level controls identified by auditors which matched with the expert panel). These results are – except for the finding relating to the impact of general experience on accuracy3 – in conformity with prior research studies (e.g., Bonner 1990; Wright, 1988).

Support was also found for the hypothesis expecting a positive impact of *industry-specific experience* on judgment performance. This hypothesis was confirmed for both the identification of client's business risks as well as the identification of client's entity-level controls. These results are in conformity with results regarding industry-expertise reported by Solomon *et al.* (1999), Taylor (2000), and Wright and Wright (1997). Regarding accuracy1 (judgment performance with respect to identifying the appropriate business risks) it was reported that judgment performance tends to increase with an increase in industry-specific experience up till a level of 1,000 hours cumulatively spent over three years to industry-specific audit engagements. From that level of 1,000 hours and more industry-specific experience, judgment performance tends to decrease. The auditors' judgment performance related to the relevance assessments of each the identified client's business risks and entity-level controls was not significantly associated with industry-specific experience. Finally, we found no significant correlation between the level of experience in the auditing field and industry-specific experience.

I did not find support for the hypothesis expecting a positive relationship between the audit managers' judgment performance and *task-specific experience*. Even a significant negative association between these two variables has been reported. With respect to auditing students a significant positive correlation was found between the auditors'

judgment performance related to the identification of entity-level controls and the number of times they performed this task last year. These results are in contrast existing literature (e.g. Bonner, 1990).

We did not find support for the hypothesis expecting a positive relationship between the *perceived level of feedback* received from supervisors when conducting risk assessments and judgment performance.

Finally, this chapter presents qualitative analyses regarding both the identification of client's business risks and entity-level controls. Audit managers, compared to auditing students, identified relatively more operational business risks than strategic business risks. For both audit managers and auditing students, these operational business risks also contributed more to judgment performance than the strategic risks. Overall, most of the business risks identified by auditors corresponded with the risk framework developed by the Foundation of Construction Research. However, auditors, in addition to the risks identified by the framework, identified more business risks which were by nature "accounting-related", which can be explained by the linkage with the financial statement audit.

5 Results of the experiment: judgment performance with respect to *assessing* the impact of client's business risks and entity-wide controls on audit risk

5.1 Introduction

In the previous chapter the results from two *identification* tasks (i.e., the identification of client's business risks and client's entity-wide controls) have been reported. Chapter 5 presents the experimental results regarding the task '*assessing* the impact of client's business risks and entity-wide controls on audit risk'. Two client's business risks and two entity-wide controls have been selected in the full factorial experiment design. The audit risk assessment relates in the experiment to financial-statement-account 'Work-in-Progress'. Particularly, we examine the potential influence of experience, perceived level of feedback when conducting risk assessments and the auditor's level of risk-aversion on judgment performance.

It is important to examine the auditors' judgment performance, as auditors (like other decision-makers) do not always make high-quality judgments, many times reflecting systematic errors (Bonner, 1999).

In the previous chapter, judgment performance has been measured by *accuracy*. For those (identification) tasks an external performance criterion was at hand, namely the expert panel's judgments. Regarding assessment tasks such an external performance criterion has not been available. Instead, we have measured judgment performance by *consensus*, making use of Brunswik's Lens Model (Brunswik, 1952). The lens model is, despite its criticisms, still widely used in research in the auditing discipline (e.g., Ashton 1973, 1974; Bonner 1990; Meixner and Welker, 1998; Trotman, 1998; Majid *et al.*, 2001) as well as many other academic disciplines (e.g. Mear and Firth 1987; Bonner *et al.*, 2003, financial analysts and investors' forecasts; Licata *et al.*, 2001, marketing; Dhami *et al.*, 2004, psychology). Consensus is often used in research studies if no accuracy criterion exists. Other judgment performance variables examined in this chapter are: the *stability* of auditors' judgments, auditors' *cue usage* as well as the auditors' *self-insight*.

In Chapter 3 we have provided a description of the Lens Model. The assessment task was modeled in a full-factorial design, using four cues. Each participating auditor was asked to weigh the impact of each of the four combinations, as well as their different combinations of occurrence, on audit risk. This resulted in 15 cases (the case in which none of the cues was present, was eliminated). The current chapter presents an overview and analysis of the Lens model's results. The underlying hypotheses to be tested are described in Table 5.1:

Table 5.1 Research hypotheses 'Judgment Performance related to assessing the impact of client's business risks and client's entity-wide controls on audit risk'

Judgment Performance related to assessing the impact of client's business risks and client's entity-wide controls on audit risk
1. *Judgment Performance related to general experience* The auditor's judgment performance is negatively influenced by general experience.
2. *Judgment Performance related to industry experience* The auditor's judgment performance is positively influenced by industry experience.
3. *Judgment Performance related to task-specific experience* The auditor's judgment performance is positively influenced by task-specific experience.
4. *Judgment Performance related to perceived level of feedback* The auditor's judgment performance is positively influenced by the perceived level of feedback received from supervisors when conducting audit risk assessments.

The results are subsequently presented using four aspects of the auditors' judgment performance: stability (5.2), consensus (5.3), cue-usage (5.4) and self-insight (5.5). At the end of this chapter, a summary of conclusions will be given.

Table 5.2 presents the descriptive statistics concerning the dependent variables relating to the assessment of client's business risks and entity-level controls on audit risk.

Table 5.2 Descriptive statistics dependent variables assessment task

Variable	***n***	***Minimum***	***Maximum***	***Mean***	***Standard Deviation***
Audit managers					
Self-insight	83	-.74	1.00	.69	.41
Stability	85	-.01	1.00	.93	.15
Consensus	85	n.a.	n.a.	.72	n.a.
Auditing students					
Self-insight	20	-.45	.99	.71	.34
Stability	20	.85	1.00	.96	.05
Consensus	20	n.a.	n.a.	.64	n.a.

Table 5.2 suggests that the level of consensus amongst audit managers' is higher compared to the level of consensus amongst auditing students (.72 versus .64). This difference is statistically significant (for more details, see section 5.3.1). The differences between audit managers and auditing students relating to the mean levels of self-insight and stability are less striking.

5.2 Auditors' *stability* of judgments with respect to assessing the impact of client business risks and entity-wide controls

For the population of audit managers an overall mean stability of .93 has been reported (standard deviation: .15). Stability has been computed as the paired Pearson correlations of the four repeat cases with the four original cases (refer to section 3.4). This implies that the auditors' judgments related to the assessment task are considerably stable. For the population of auditing students, an overall level of stability of .96 has been reported (standard deviation of .05).

The remainder of this section deals with:

- The correlation between stability and accuracy (as judgment performance measure used in the previous chapter);
- Tests of hypotheses related to judgment performance as measured by stability.

5.2.1 Correlation between stability and accuracy

Stability negatively correlates with accuracy1 (identification of client's business risks measuring the number of business risks identified by the participant matching with the expert panel): -.217 (significance .023). This finding suggests that audit managers perform differently on identification tasks and assessment tasks (in conformity with Bedard and Graham, 2002) and stresses the need for improvement of auditors' judgment quality in the planning phase of the financial statement audit. For auditing students, a correlation has been reported of -.293 (significance, .105).

5.2.2 Tests of hypotheses related to judgment performance as measured by stability

Correlation between stability and experience

No significant correlations were found between stability on the one hand and general experience and industry-specific experience on the other hand.

Table 5.3 presents the 1-tailed Pearson correlations between the distinguished task-specific experience variables and stability.

Table 5.3 Pearson correlations between task-specific experience and Judgment Stability (p<.1 significant)

	IDBR1	IDBR2	WBR1	WBR2	IDBM1	IDBM2	WBM1	WBM2
Managers	n = 83	n = 83	n = 84	n = 84	n = 84	n = 84	n = 83	n = 83
Stability	.167 (.065)*	.172 (.060)*	.164 (.069)*	.232 (.017)*	.120 (.137)	.190 (.042)*	.204 (.032)*	.249 (.012)*
Students	n = 20	n = 20	n = 19	n = 19	n = 19	n = 19	n = 20	n = 20
Stability	-.045 (.425)	.184 (.218)	.036 (.442)	.200 (.206)	.153 (.266)	.314 (.095)*	.085 (.361)	.286 (.111)

Legend to Table 5.3:

- Idbr1: Number of times the task 'identification of client's business risk' performed in last year;
- Idbr2: Number of hours spent on the task 'identification of client's business risk' in last year;
- Wbr1: Number of times the task 'assessing the impact of client's business risk on audit risk' performed in last year

- Wbr2: Number of hours spent on the task 'assessing the impact of client's business risk on audit risk' in last year;
- Idbm1: Number of times the task 'identification of client's entity-wide controls' performed in last year;
- Idbm2: Number of hours spent on the task 'identification of client's entity-wide controls' in last year;
- Wbm1: Number of times the task 'assessing the impact of the client's entity-wide controls on audit risk' performed in last year;
- Wbm2: Number of hours spent on the task 'assessing the impact of the client's entity-wide controls on audit risk' in last year.

From Table 5.3 it follows that stability positively correlates with nearly all of the task-specific experience except for IDBM1. This finding contrasts Table 4.20 in the previous chapter showing a significantly negative correlation between accuracy1 (judgment performance related to the identification of client's business risks) and task-specific experience. The correlations presented in Table 5.3 suggest that judgment consistency improves when auditor's task-specific experience (measured in hours) increases. This is in conformity with Bonner (1990). Repeat engagement experience might also be helpful in reaching higher stability levels.
We conclude that hypothesis 1 and 2 is not supported (for judgment performance measured by stability) and hypothesis 3 is supported.

Correlation between stability and the perceived level of feedback when conducting risk assessments

For audit managers, a significant positive (1-tailed) correlation between Stability and the perceived level of feedback has been reported of .251 (significance .011, n=84). For auditing students, this correlation was not significant (correlation of .095, significance of .346, n=20). Hence, we conclude that hypothesis 4 is supported for audit managers, but not for auditing students. This suggests that feedback is a helpful mechanism to increasing judgment stability.

5.3 Auditors' judgment *consensus* with respect to assessing the impact of client business risks and entity-wide controls on audit risk

Consensus between auditors is used as a surrogate for auditors' judgment accuracy which has been used in the previous chapter as a measure for judgment performance in

an identification task. Consensus or 'agreement' is defined as "the degree of correlation between a judge's responses to cue profiles or configurations in a task and the responses made by another judge to those same profiles" (Cooksey, 1995, p. 367). Consensus is measured, making use of Brunswik's lens model, as the pair-wise correlations of (impact on) risk assessment for each pair of auditors. All participants have completed 15 case combinations, resulting in 15 assessments of the impact of each (or in combination) of the four cues on audit risk. For each pair of auditors, the pairwise Pearson correlation has been computed, resulting in 3,570 consensus/correlation coefficients.
In this paragraph we first perform data-analyses for the dataset as a whole (5.3.1), subsequently followed by description of the tests of hypotheses related to consensus (section 5.3.2).

5.3.1 Overall analysis of consensus

Consensus has been measured as the correlations of the judgments of each pair of auditors (excluding auditing students) on the 15 case combinations. For the group of audit managers this resulted in 3,570 correlation coefficients[38]. For the dataset of audit managers an overall consensus of .72 is reported (standard deviation .174). Others reported comparable consensus averages (e.g. Ashton, 1973: .70; Bonner, 1990: .63-.65; Meixner and Welker, 1988: .73) for assessment tasks in audit risk decisions[39, 40]. Zimmer's study (Zimmer, 1980) involved loan officers making annual predictions of failure of corporations based on a series of ratios. Zimmer reported a mean consensus level of .72, which is consistent with comparable studies related to loan officers (e.g.,

[38] Which are computed as follows: ((85 participants * 85 participants) -/- (85 respondents)) / 2.

[39] Shanteau (2002) examined various knowledge domains and concluded that auditors show, compared to other domains, relatively high performance-levels and categorized auditors' judgment/decision-making in general as 'aided decisions'. Other types of decisions (with lower performance-levels) are 'competent', 'restricted', and 'random'. Shanteau reports for auditors average consensus values of .76; only weather forecasters show higher performance-levels with an average consensus level of .95. Experts with lowest performance include polygraphists (average consensus of .33) and stock-brokers (average consensus of .32).

[40] Embly and Finley (1997) reported framing biases in judgments related to internal control systems. Auditors, making their judgments in terms of "risks" (e.g. control risk), tend to under-rely on internal control systems. Auditors making their judgments in terms of "control strengths" tend to over-rely on internal control systems.

Libby 1975). Given the relative novelty of the business risk audit approach relatively lower consensus levels could have been expected in the present study.

For the population of auditing students an average consensus-level of .64 was found. Ashton and Kramer (1980) reported a similar result (consensus of .66 for students). With the t-statistic, this average consensus level significantly differed from the consensus level of audit managers (Levene's test for equality of variances: F=16,235 and significance .000; t-test for equality of means: t=-6.113; df= 221.015 and significance .000). Zimmer (1980) also used (financial accounting) students in order to investigate the "students as surrogate" issue, and reports accurate self-insight into the accuracy of each prediction, and showed a high degree of judgment consensus (mean levels have not been reported). Based upon auditing research (e.g. Bonner *et al.*, 1997) it can be argued that the auditors' judgment performance is both influenced by knowledge and experience. From this perspective, the significant difference in judgment performance between audit managers and auditing students is not surprising. However, one might on the other hand argue that auditing students possess a mind-set that is to a minor extent framed by experience in the auditing field compared to the mindset of audit managers. The findings, however, suggest that experience, given the specific case-setting, has led to a higher quality of judgment performance. This suggestion is in conformity with Ashton and Kramer (1980), although these authors correctly added that the differences reported are relatively low. Ashton and Kramer (1980) reviewed many studies relating to differences between students and more experienced subjects. Most of them conclude that decision-making seems to be very similar for students and more experienced subjects across a variety of tasks. From a psychological perspective, this may be explained by the fact that experts are prone to the same judgment biases compared to novices to the task (see section 2.3).

The four cues, used in the experiment, were:

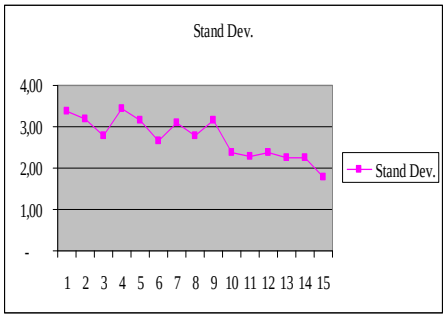
1 Financial condition of the company strongly deteriorated (client business risk, CBR 1);
2 The company's strategy changed from "low-cost home-construction" to "luxury villas" (CBR 2);
3 Strengthened project-control by progress reports on Work in Progress (entity-wide control, EWC 1); and
4 More specialized personnel assigned to projects (EWC 2).

We used ‘standard deviation’ for the variable ‘impact on audit risk assessment’ to analyze the impact of each of the four cues individually as well as the impact of the cue combinations. The result is presented in Table 5.4 and Figure 5.1:

Table 5.4 Standard deviations versus cases

	Case #	Stand Dev.
Number of 4 cues	1	3,38
	2	3,20
	3	2,78
	4	3,45
Number of 3 cues	5	3,15
	6	2,67
	7	3,09
	8	2,79
	9	3,16
	10	2,38
Number of 2 cues	11	2,27
	12	2,38
	13	2,24
	14	2,26
Number of 1 cue	15	1,78

Fig. 5.1 Standard deviations vs case number



From Table 5.4 and Figure 5.1 follows that the cases with only one cue present contribute most to the reported consensus results. Cases 12 to 15 show the standard deviations related to the impact assessments when only 1 cue is present in the case. These standard deviations range from 1.78 to 2.38. Compared to the standard deviations related to cases with more cues present (cases 1 to 10), ranging from 2.27 to 3.45, the standard deviation in cases with only 1 cue present is lower. Auditors, like everyone, experience bounded rationality (e.g. Choy and King, 2003). An increase in the number of cues will most probably result in higher standard deviations, i.e. lower consensus levels (e.g., Cooksey, 1995).

From a probabilistic perspective (i.e., looking at the group of auditors as a whole, as opposed to an ideo-graphic perspective), we conclude that on average, auditors show a relatively high level of judgment performance for the assessment task performed by the participants of the experiment. On a more detailed level, the cases with only one cue present contributed mostly to this conclusion.

5.3.2 Tests of hypotheses related to judgment performance as measured by consensus

This section contains the following sub-sections:
- The impact of experience on judgment performance;
- The impact of the perceived level of feedback on judgment performance;
- The impact of the auditor's level of risk-aversion on judgment performance; and
- The impact of case-sequence on judgment performance.

For each of the following sub-sections consensus has been computed as the Pearson-correlation of each pair of auditors. As described in section 5.3.1, this resulted in 3,570 correlations. As consensus is by nature not a measure to evaluate individual auditors' judgment performance but an inter-auditor measure, for each of the independent variables sub-groups have been distinguished. The mean consensus levels of the sub-groups will be compared to each other. To assess the significance of differences in judgment performance, the correlation coefficients have been recomputed with the 'Fisher r to Z transformation'. Transformation of the Pearson correlations is necessary since these correlations are not normally distributed (Ashton, 1973; Cooksey, 1995). All independent variables have been distinguished in more than two sub-groups. The classification of a group of audit managers into sub-groups has been based (equal) sample size considerations. Assessment of the significance of differences in judgment performance across sub-groups will accordingly be performed with Scheffé's multiple post-hoc comparisons.

The impact of the independent variables (including the impact of case sequence) on consensus is shown in the following Table.

Table 5.5 Overview impact independent variables on consensus

Panel A: impact of general experience (# of years experience in auditing) on consensus

Group	**1**	**2**	**3**
Experience	< 10	>= 10 - < 15	>= 15
Consensus	.75	.70	.70

Panel B: impact of industry experience (# of hours spent on industry-specific audit engagements over the past three years) on consensus

Group	**1**	**2**	**3**	**4**	**5**
Experience	0	>0 - <250	>=250-<500	>=500-<1,000	>=1,000
Consensus	.74	.61	.78	.73	.59

Panel C: impact of task-specific experience (# of times task 'assessment impact of CBR on audit risk performed last year) on consensus

Group	**1**	**2**	**3**	**4**
Experience	< 5	>=5 - < 10	>=10 - <15	>=15
Consensus	.71	.71	.72	.77

Panel D: impact of task-specific experience (# of times task 'assessment impact of ELC on audit risk performed last year) on consensus

Group	**1**	**2**	**3**	**4**
Experience	< 5	>=5 - < 10	>=10 - <15	>=15
Consensus	.69	.73	.71	.77

Table 5.5 (continued) Overview impact independent variables on consensus

Panel E: impact of perceived level of feedback (# of times the participant perceives feedback on audit risk assessments from a supervisor) on consensus

Group	**1**	**2**	**3**	**4**
Feedback	< 2,5	>= 2,5 - < 5	>=5 - <7,5	>=7,5
Consensus	.66	.68	.76	.72

Panel F: impact of level of risk-aversion (% of certainty required to choose highest win in gamble game) on consensus

Group	**1**	**2**	**3**
Risk-aversion	<= 50%	> 50% - <=75%	> 75%
Consensus	.72	.78	.64

Panel G: impact of case sequence on consensus

Group	**1**	**2**	**3**
Case sequence	1	2	3
Consensus	.70	.73	.72

In the following sub-sections the statistical results of each of the panels of Table 5.5 will be clarified.

A. The impact of experience in the auditing field on the level of consensus

The entire group of audit managers has been split into three different sub-groups with different intervals of experience in the auditing field: the first group reports less than 10 years of experience (n=27), the second group reports more than or equal to 10 and less than 15 years of experience (n=33), and the third group reports more than 15 years of experience (n=23). The third group included two outliers with 35 and 42 years of experience respectively. These outliers have been excluded in the analysis of judgment performance as measured by consensus, resulting in 3,403 correlation coefficients instead of 3,570 as mentioned in section 5.3.1.

The Scheffé-test for multiple post-hoc comparisons has been used to investigate the statistical significance of the differences of the group means. According to the Scheffé-test all differences between groups, except for the difference between groups 2 and 3, are statistically significant. According to hypothesis 1 a negative direction for the impact of experience on judgment performance was expected. The statistical results provide support for this hypothesis, although the differences between group 1 versus group 2 and 3 are relatively small (.75 versus .70).

Existing research literature has provided mixed results related to the impact of experience in the auditing field on the auditors' judgment performance (e.g. Libby and Luft, 1993; Bonner 1990). Potential explanations for the evidence presented in Table 5.5 are differences in task-specific experience and engagement-specific experience across auditors. Additionally, Meixner and Welker (1988) reported no positive impact of experience on judgment consensus, but consensus did increase with an increase of the length of time that staff auditors had been associated with the same audit manager. As the debriefing questionnaire did not specifically refer to the length of time working under the same supervisor, it is not clear whether the results presented in Table 5.5 have been influenced by this variable.

B. The impact of industry-specific experience on the level of consensus

The entire group of audit managers has been split into five sub-groups with different intervals of industry-specific experience (as measured in hours spent on industry-specific clients over the past three years), which resulted in sub-groups of more or less equal size:

- Group 1: auditors with zero hours of industry-specific experience (n=28);

- Group 2: auditors with more than zero but less than 250 hours of industry-specific experience (n=14);
- Group 3: auditors with more than or equal to 250 hours and less than 500 hours of industry-specific experience (n=11);
- Group 4: auditors with more than or equal to 500 hours and less than 1,000 hours of industry-specific experience (n=14);
- Group 5: auditors with more than or equal to 1,000 hours (n=17), excluding outlier respondent with 3,000 hours of industry-specific experience.

Excluding the previously mentioned outlier, a number of 3,486 correlation coefficients resulted.

The Scheffé method for multiple post-hoc comparisons has been used to assess the statistical significance of differences in mean consensus levels across the groups. This resulted in the following statistically significant ($p < .1$) differences in consensus across groups:

- Group 1 significantly differs from groups 2 and 5;
- Group 2 significantly differs from groups 1 and 3;
- Group 3 significantly differs from group 2;
- Group 4 does not significantly differ from all other groups;
- Group 5 significantly differs from the groups 1, 2, and 3.

The relatively high level of consensus for the sub-group of auditors with zero hours of industry-specific experience (n=28) is remarkable. This contrasts with hypothesis 2 in which a positive impact of (industry-specific) experience on judgment performance was expected. One possible explanation for this finding is that this sub-group is not ‘hindered’ by client-specific knowledge. Related to the sub-group of audit managers with less than 250 hours of industry-specific experience, this can give rise to the supposition that some industry-specific experience does not provide a good benchmark or overview of the construction-industry as a whole in which the given case-setting would fit. In other words, the sub-group of audit managers with less than 250 hours of industry-specific experience is probably distracted from taking the right audit risk decision. E.g., assume that each audit manager in this sub-group has experience with only one audit client in the construction industry. Some of them probably face bias in under-assessing audit risk (e.g. their only construction-client performs very well and has a well designed and operating control structure), others probably face bias in over-assessing audit risk. E.g., their only construction-client performs very badly and does not have any proper procedures in place or their client was confronted with such a business risk that

continuance of the company was seriously questionable. Both examples, and particularly these audit managers in combination, result in a relatively lower level of consensus within the sub-group.

The third and fourth sub-group (the sub-group with industry-specific experience between 250 and 500 hours, respectively, the sub-group with industry-specific experience between 500 and 1,000 hours) also show relatively high judgment performance. These sub-groups are in contrast with the last sub-group (more than 1,000 hours of industry-specific experience) which shows a relatively low level of consensus. Recall from section 4.4.3 that for audit managers with more than 1,000 hours of industry-specific experience a negative correlation was found with accuracy 2 and accuracy 4 (both accuracy-measures measure the importance of each of the five client's business risks and five entity-wide controls identified by the auditor). Taken together, both the results of the identification tasks (the identification of client's business risks and entity-wide controls) and the assessment task suggest that judgment performance declines from a certain level of industry-specific experience. In section 4.4.3 it was suggested that this finding is caused by engagement-specific experience. This might be the case. Audit firms more and more organize the firm along industry-specific service lines. From previous research literature (e.g. Taylor, 2000; Solomon *et al.*, 1999) there is evidence that for some industries (like Financial services, Healthcare) an increase in industry-specific experience is accompanied with higher judgment performance, probably due to the highly-regulated nature of the industry.

We conclude for the group of audit managers that hypothesis 2 is partly supported (difference between group 2 and 3), and partly not supported (groups 1, 4 and 5).

C. The impact of task-specific experience (related to task 'assessing the impact of client's business risks on audit risk) on the level of consensus

The entire group of audit managers has been split into four different sub-groups with different intervals of task-specific experience. As the assessment task in the experiment both involves assessing the impact of client's business risks as well as assessing the impact of client's entity-wide controls on audit risk, we have distinguished two types of task-specific experience as well (both measuring the number of times the task has been performed last year).

The Scheffé test for multiple post-hoc comparisons shows that for audit managers, group 4 differs significantly with all other groups. We conclude that for audit managers the hypothesis 3 (expecting a positive association between task-specific experience and judgment performance) is supported.

D. The impact of task-specific experience (related to task 'assessing the impact of client's business risks on audit risk) on the level of consensus

The Scheffé test for multiple post-hoc comparisons shows that for audit managers group 1 differs significantly from the groups 2 and 4. Additionally, group 3 differs significantly from group 4. We conclude that hypothesis 3 is supported.

The results from Table 5.5 contrast with the results presented in Table 4.20 where negative correlations between task-specific experience and accuracy 1 and 3 have been reported. The results presented in Table 5.5 are in conformity with the results of Bonner (1990) suggesting that task-specific knowledge contributes to increased auditors' judgment performance (see also Trotman, 1998).

E. The impact of the perceived level of feedback on judgment performance

Hypothesis 4 expects a positive association between the auditor's judgment performance and the perceived level of feedback when conducting risk assessments. The perceived level of feedback has been measured on an 11-point scale ranging from zero (sometimes) to ten (often). The entire group of audit managers has been divided into the following four sub-groups:

- Group 1: auditors perceiving a level of feedback of '2.5' or lower when conducting risk assessments (n=20);
- Group 2: auditors perceiving a level of feedback higher than or equal to '2.5' and lower than '5' when conducting risk assessments (n=13);
- Group 3: auditors perceiving a level of feedback higher than or equal to '5' and lower than '7.5' when conducting risk assessments (n=28);
- Group 4: auditors perceiving a level of feedback higher than '7.5' (n=23).

The Scheffé-test for multiple post-hoc comparisons reveals that group 1 significantly differs with groups 3 and 4 and group 2 significantly differs with group 3. Hence, Table

5.5 shows an increased judgment performance for the groups of auditors with perceived levels of feedback ranging from 0 to 7.5. For these groups hypothesis 4 has been supported. This contrasts with the negative direction of the correlation between the perceived level of feedback and judgment performance (measured by accuracy) as reported in Table 4.24. Although Table 4.24 does not show significant correlations the perceived level of feedback seems to have a negative impact on accuracy and a positive impact on consensus. However, the results are in conformity with prior research on the impact of feedback on judgment performance (Tuttle and Stocks, 1998; Ashton, 1990, 1992; Arkes *et al.,* 1986).

F. The impact of the auditors' risk-attitude on judgment performance

Related to the impact of the level of risk-aversion no directional hypothesis has been developed. In order to be able to examine the impact of the level of risk-aversion on judgment performance, the entire group of audit managers has been split into the following sub-groups of more equal size:

- Group 1: audit managers with less than or equal to '50%' level of risk-attitude (n=25);
- Group 2: audit managers with more than '50%' and less than or equal to '75%' level of risk-attitude (n=28); and
- Group 3: audit managers with more than '75%' level of risk-attitude (n=29).

The Scheffé-test for multiple post-hoc comparisons results in a significant difference between group 2 and group 3. Table 5.11 reveals that the group, with mean level of risk-aversion higher than or equal to 50% and smaller than 75% show the highest level of consensus compared to the groups of auditors with lower or higher risk-aversion levels. The result is in conformity with the suggestion that more risk-averse auditors show in their judgment and decision-making process to deviate from optimal judgment performance. Group 2 is positioned more near to the optimum (risk-neutral situation of 40%) compared to group 3. It is hence suggested, that the level of consensus (which may serve as a scale of increasing judgment performance to optimal levels) is negatively influenced by the level of risk-aversion. In the current audit environment, audit firms are increasingly aware of running reputation risks since bookkeeping scandals (Enron, Worldcom, etc.) were reported. Delivery of high levels of audit quality is of high importance to audit firms in decreasing reputation risks. It can be argued that audit firms

in this regard may have benefit of high levels of judgment consensus. Auditors showing increasing levels of risk-aversion may be a threat to this benefit.

G. The impact of case sequence on judgment performance

Section 5.3.1 described the four cues which have been presented in different combinations to the participants in the experiments. As a 2^4 full factorial design has been used in the experiment, respondents have been provided with fifteen different cue combinations (the combination 'no cues present' has been eliminated from the experiment design as this cue combination is not meaningful to the respondent). Respondents have been asked to assess the combined impact of each of the four cues on audit risk. Each respondent received one of the three versions of different cue sequence combinations. The first sequence of case combinations starts with all four cues and the next cases incorporate three cues or less. The second sequence of case combinations is inverse to sequence 1, starting with only one cue present, and followed in the next cases with more than one cue. The third sequence of case combinations is a combination of sequences of 1 and 2. The case sequences are presented in Table 3.3. The rationale underlying to the use of different sequences of case combinations is – in conformity with Ashton (1973, 1974) – found in the length of the questionnaire and, hence, the possible influence of fatigue or boredom.

The three sequences/versions were distributed over the group of audit managers as follows:

- Group 1: auditors with sequence 1 (n=31);
- Group 2: auditors with sequence 2 (n=30); and
- Group 3: auditors with sequence 3 (n=24).

Although the average consensus levels do not show a high (absolute) difference, the Scheffé-test for multiple post-hoc comparisons reveals that groups 1 and 2 significantly differ from each other. Potential explanations for this difference might be the presence of factors like fatigue or boredom (due to the repetitiveness of case combinations).

5.4 Auditors' *cue usage* with respect to assessing the impact of client business risks and entity-wide controls on audit risk

In this section, potential factors influencing the auditors' judgment performance as measured by "cue usage" will be examined. Cue usage is concerned with the weights auditors put on each of the four cues when assessing the impact of these cues on audit risk:

- "Financial position dramatically deteriorated" (general client's business risk);
- "Strategic change from normal homes to luxury villa's" (industry-specific client's business risk);
- "Increased project control by project progress reports" (industry-specific entity-wide control);
- "More specialized personnel designated to projects" (general entity-wide control).

5.4.1 Overall analysis of cue usage: audit managers versus auditing students

The cue weights, auditors applied to the four cues in assessing their impact on audit risk, are the (beta) weights resulting from linear regression. Linear regression has been performed for each auditor, resulting in individual regression weights. For audit managers and auditing students Table 5.6 reports the means of beta weights put on each of the four cues:

Table 5.6 Overview of the auditors' cue usage (beta weights)

	Weight Cue 1	**Weight Cue 2**	**Weight Cue 3**	**Weight Cue 4**
Cue description	"Financial position dramatically deteriorated"	"Strategic change from normal homes to luxury villa's"	"Increased project control by project progress reports"	"More specialized personnel designated to projects"
Cue nature	*General business risk*	*Industry-specific business risk*	*Industry-specific entity-wide control*	*General entity-wide control*
Audit managers	.40	.41	-.39	-.12
Auditing students	.42	.29	-.44	-.15
Overall	.40	.39	-.40	-.13

The highest difference between cue weights of audit managers compared auditing students relates to cue 2 “Strategic change from normal homes to luxury villas”. The following linear regression model was developed in order to assess the significance of differences between audit managers and auditing students.

Impact on audit risk = $\alpha + \beta 1Cue1 + \beta 2Cue2 + \beta 3Cue3 + \beta 4Cue4 + \beta 5Accstud + \varepsilon$

This linear regression model shows the following results:

Table 5.7 Regression model results audit managers versus auditing students

Model summary					
	R	R square	Adjusted R square	Std.error of the estimate	
	.72	.518	.517	2.84952	
ANOVA					
Model	Sum of squares	df	Mean square	F	Sig.
Regression	13700.448	5	2740.09	337.46	.000*
Residual	12731.83	1568	8.12		
Total	26432.28	1573			
Coefficients					
Model	Unstandardized coefficients		Standardized coefficients		
	B	Std.error	Beta	t	Sig.
Constant	.140	.239		.586	.558
Cue1	3.287	.145	.40	22.621	.000*
Cue2	3.192	.145	.39	21.974	.000*
Cue3	-3.247	.145	-.40	-22.347	.000*
Cue4	-1.025	.145	-.13	-7.057	.000*
Accstud	.805	.183	.077	4.402	.000*

From the linear regression model, it follows that the variable ‘accstud’ (differentiating between audit managers and auditing students) significantly contributes to differences in cue usage. This suggests that general experience in auditing may result in differences in cue usage, dependent of the nature of a cue. Ashton and Kramer (1980) report for example that auditors more heavily rely on segregation-of-duties cues compared to

other internal controls. Auditors may have experienced different client settings in which specific client's business risks may differ. Related to cue2, for example, auditors – as opposed to students – are assumed to be more involved in client strategy or risk insight sessions on Board level, where in more depth the consequences of specific strategic opportunities of choices have been evaluated. Explicit consideration of these consequences may have resulted in higher cue weights for auditors as compared to auditing students.

5.4.2 Overall analysis of cue usage: the impact of independent variables on the audit manager's cue usage

The previous sub-section showed that differences are present in the audit manager's and auditing student's cue-usage. In this sub-section, it is investigated whether cue-usage is influenced by personal characteristics of audit managers. The following regression model has been developed related to all fifteen cases together. Subsequent analyses will focus on the potential influence of personal characteristics of audit managers on cue usage in single cases.

Impact on audit risk = $\alpha + \beta 1Cue1 + \beta 2Cue2 + \beta 3Cue3 + \beta 4Cue4 + \beta 5GenExp + \beta 6IndExp + \beta 7TaskExpWBR1 + \beta 8TaskExpWBM1 + \beta 9Feedback + \beta 10RiskAversion + \varepsilon$

Where:

GenExp	= Level of general experience
IndExp	= Level of industry experience
TaskExpWBR1	= Level of task-experience related to assessing the impact of business risks on audit risk
TaskExpWBM1	= Level of task-experience related to assessing the impact of entity-level controls on audit risk
Feedback	= Level of perceived feedback when conducting audit risk assessment task
Risk-aversion	= Level of risk-aversion in a gamble game.

This linear regression model shows the following results:

Table 5.8 Regression model results independent variables audit managers

Model summary					
	R	R square	Adjusted R square	Std.error of the estimate	
	.72	.523	.519	2.87744	
ANOVA					
Model	Sum of squares	df	Mean square	F	Sig.
Regression	10647.39	10	1064.74	128.597	.000*
Residual	9712.05	1173	8.28		
Total	20.359.44	1183			
Coefficients					
Model	Unstandardized coefficients		Standardized coefficients		
	B	Std.error	Beta	t	Sig.
Constant	.617	.411		1.503	.133
Cue1	3.197	.169	.39	18.899	.000*
Cue2	3.485	.169	.42	20.607	.000*
Cue3	-3.202	.169	-.39	-18.926	.000*
Cue4	-.980	.169	-.12	-5.794	.000*
GenExp	-.024	.014	-.04	-1.707	.088*
IndExp	.000	.000	-.04	-.1571	.116
TaskExpWBR1	.100	.032	.18	3.102	.002*
TaskExpWBM1	-.064	.031	-.12	-2.042	.041*
Feedback	-.023	.035	-.02	-.672	.502
Risk-aversion	.004	.004	.03	1.205	.229

From the linear regression model results it follows that general experience, and the two-task-specific experience variables significantly influence the auditor's cue usage. It should be noted, however, that would the variables 'feedback' and 'risk-aversion' have been excluded from the regression model, the variable 'general experience' would not significantly influence the auditor's cue usage. In the following Table, the 2-tailed Pearson correlations are shown (correlations excluding outliers).

Table 5.9 Correlation matrix cases (one cue present) versus independent variables audit managers

	Cue0100	Cue0010	Cue1000	Cue0001	Cue1001	Cue0110	Cue0111	Cue1101	Cue1110	GenExp	IndExp	Wbr1	Wbm1	feedback	Risk-av.
Cue0100	1	-.006 (.958)	.278* (.012)	.039 (.732)	.266* (.016)	.648* (.000)	.536* (.000)	.512* (.000)	.490* (.000)	.157 (.162)	-.097 (.391)	.020 (.858)	.015 (.892)	-.049 (.663)	-.158 (.168)
Cue0010		1	-.024 (.833)	.414* (.000)	-.073 (.516)	.229* (.040)	.241* (.030)	-.131 (.243)	.176 (.116)	.152 (.176)	-.019 (.866)	-.021 (.855)	-.001 (.992)	-.048 (.672)	.163 (.153)
Cue1000			1	-.001 (.990)	.624* (.000)	.305* (.006)	.191* (.087)	.447* (.000)	.368* (.001)	-.060 (.595)	-.109 (.332)	-.169 (.134)	-.134 (.239)	-.087 (.442)	.129 (.260)
Cue0001				1	.326* (.003)	.084 (.454)	.180 (.108)	.018 (.877)	-.071 (.528)	.102 (.365)	.124 (.268)	-.074 (.513)	-.094 (.411)	-.051 (.651)	.203* (.075)
Cue1001					1	.322* (.003)	.339* (.002)	.535* (.000)	.251* (.024)	-.081 (.473)	-.004 (.973)	-.122 (.281)	-.222* (.049)	-.031 (.784)	.141 (.218)
Cue0110						1	.805* (.000)	.566* (.000)	.734* (.000)	.078 (.487)	-.068 (.545)	.220* (.050)	.170 (.134)	-.001 (.992)	-.036 (.754)
Cue0111							1	.553* (.000)	.675* (.000)	-.010 (.931)	-.114 (.310)	.227* (.043)	.153 (.178)	-.025 (.828)	.111 (.334)
Cue1101								1	.650* (.000)	-.023 (.840)	-.199* (.075)	.099 (.380)	.054 (.635)	.056 (.624)	.021 (.855)
Cue1110									1	-.014 (.899)	-.104 (.356)	.157 (.164)	.188* (.097)	.105 (.352)	-.037 (.745)
GenExp										1	.021 (.856)	.121 (.285)	.018 (.875)	-.329* (.003)	-.037 (.749)
IndExp											1	-.135 (.234)	-.266* (.018)	.265* (.017)	-.147 (.201)
Wbr1												1	.883* (.000)	-.144 (.205)	-.094 (.414)
Wbm1													1	-.120 (.294)	-.083 (.477)
feedback														1	.026 (.825)
Risk-av.															1

Table 5.9 results in the following observations:

- In our analysis of Table 5.8, it was noted that general experience contributed to cue usage, but only when the variables 'feedback' and 'risk-aversion' were included in the regression model. From Table 5.9 it follows that none of the single cases significantly correlates with general experience.
- In the regression model presented in Table 5.8, it was indicated that industry experience did not significantly contribute to cue usage. From the correlation matrix presented in Table 5.9, it follows that only in case 1101, a significant negative correlation of .199 is reported between industry experience and audit risk assessment. Case 1101 is a case where two business risks are present and one weak entity-level control. This may be caused by assessing the impact on audit risk of cue1 ("financial condition dramatically deteriorated") lower compared to audit managers with less industry experience since this case shows the highest negative correlation compared to the cases 0100 ("strategic change") and 0001 ("more specialized personnel"). A reason for this may be that auditors who are not experienced in a certain industry assess inherent risk in a specific industry higher (i.e., more conservative) compared to industry-specialized auditor's (Taylor, 2000). This explanation is clearly not valid for all cases, where no significant correlations were reported.
- Table 5.8 reports a significant contribution of task-specific experience to cue usage. In the correlation matrix, a significant positive correlation between task-specific experience related to 'assessing the impact of *client's business risks* on audit risk' and the cases 0100 and 0111. Both cases include only the business risk cue2 ("strategic change"). A potential reason for explanation of this finding is that cue1 ("financial condition dramatically deteriorated") is classified as a generic business risk, which implies that this risk may apply to more than one financial statement account, or even to the financial statements as a whole. Task-specific experience, hence, may be helpful for assessing the impact of those cues on audit risk, which are clearly related to a single financial statement account.
- With respect to task-specific experience related to 'assessing the impact of *client's entity-level controls* on audit risk' a significant negative correlation has been reported related to case 1001, and a significant positive correlation has been reported related to case 1110. Auditors with more task-specific experience assess the impact of client's business risk cue1 ("financial position dramatically deteriorated") lower in case 1001 compared to auditors with less task-specific experience. Business risk cue1 (see previous bullet) is a generic business risk cue, and auditors with more task-specific experience may have allocated the impact of this business risk to more than one financial statement account. In addition, this

type of auditors is more experienced in assessing the impact of controls on audit risk, which may imply that they identified controls based on the case description which mitigated the impact of this risk. With respect to the other case (case 1110), the positive correlation between task-specific experience and impact on audit risk seems to be caused by assessing a lower audit risk-reducing impact of cue3 ("increased project control") in mitigating business risk cue2 ("strategic change").

- The regression model presented in Table 5.8 showed that risk-aversion did not significantly influence the impact on audit risk decision. When this decision is taken on a single case, the correlation matrix shows a positive impact of risk-aversion on the impact on audit risk assessment related to case0001. Overall auditors assessed a relatively low impact of this control cue ("more specialized personnel") on audit risk (i.e., a cue weight of -.12). From the correlation matrix, it follows that more risk-averse auditors assess the impact of this single control on audit risk significant higher compared to less risk-averse auditors. A higher impact on audit risk implies that the control is deemed to be less effective in mitigating audit risk.

None of the cases showed a significant correlation between case sequences (cases were distributed making use of three different case sequences) and the impact on audit risk decision. This provides some evidence that participants did not act differently because of fatigue or boredom and assessed each of single cases separately and consciously.

5.5 Auditors' *self-insight* with respect to assessing the impact of client business risks and entity-wide controls

Having described the quality of auditors' judgment performance in terms of stability, consensus and cue usage, this paragraph is concerned with another component of auditors' judgment performance, namely the level of auditors' self-insight. Self-insight has been conceptualized as "the extent to which a person acquires analytically-oriented knowledge about his or her own intuitive or quasi-rational cognitive processes" (Cooksey, 1995, p.97). The individual auditors' self-insight has been computed as follows. First, derived from linear regression statistics, the auditors' cue weights have been computed (standardized beta weights). These weights are called 'objective' weights. The 'objective' weights have been correlated with the auditors' 'subjective' weights. These correlations represent the auditors' self-insight. In order to compute subjective weights, participants in the experiment have been requested in the debriefing

questionnaire to distribute 100 points of weights they assumed having attached to each of the four cues. Finally, the objective weights have been recomputed to make them comparable to the subjective weights. This involved recalculation of each of the four regression weights to a 100-point basis. Table 5.10 provides an example of this recalculation:

Table 5.10 Example of recalculating regression weights to objective weights

	Regression weights	Objective weights
Cue 1	.25	25
Cue 2	.25	25
Cue 3	(.25)	25
Cue 4	(.25)	25
	-	100

For audit managers, a mean level of self-insight of .69 has been reported. This level of self-insight is quite high as it has been measured over a sum of 15 case combinations.

The following table provides an overview of the mean levels of self-insight across the various groups related the independent variables.

Table 5.11 Overview of mean levels of self-insight

Panel A: The impact of general experience on the auditor's self-insight

Level of experience	n	Mean	Standard deviation
< 10	27	.75	.33
>= 10 - < 15	32	.65	.45
>= 15	22	.63	.45

Panel B: The impact of industry specific experience on the auditors' self-insight

Hours	n	Mean	Standard deviation
0	28	.79	.21
> 0 - < 250	13	.68	.45
>= 250 - < 500	11	.61	.46
>= 500 - < 1,000	14	.60	.45
>= 1,000	16	.63	.55

Panel C: The impact of task-specific experience (related to the task 'assessing the impact of client's business risks on audit risk) on the auditor's self-insight

Task-specific experience	n	Mean	Standard deviation
<5	15	.50	.58
>= 5 - < 10	18	.70	.36
>=10- < 15	30	.71	.39
>=15	18	.79	.29

Panel D: The impact of task-specific experience (related to the task 'assessing the impact of client's entity-level controls on audit risk) on the auditor's self-insight

Task-specific experience	n	Mean	Standard deviation
<5	16	.56	.58
>= 5 - < 10	19	.75	.30
>=10- < 15	26	.64	.43
>=15	19	.78	.28

Table 5.11 (continued) *Overview of mean levels of self-insight*

Panel E: The impact of the perceived level of feedback on the auditors' self-insight

Level of feedback	n	Mean	Standard deviation
< 2,5	19	.65	.50
>= 2,5 - < 5	13	.52	.53
>= 5 - < 7.5	28	.71	.38
>= 7.5	22	.79	.22

Panel F: The impact of the level of risk-aversion on the auditors' self-insight

Risk-aversion	n	Mean	Standard deviation
<= 50%	25	.66	.47
> 50% - <= 75%	27	.75	.31
> 75%	28	.68	.38

Panel G: The impact of case-sequence on the auditor's self-insight

Case-sequence	n	Mean	Standard deviation
1	30	.66	.41
2	30	.73	.42
3	23	.66	.41

Based on Scheffé tests for multiple post-hoc comparisons, none of the group means across the various independent variables differed significantly and, hence, will not be further explained.

5.6 Does consensus imply accuracy in the study of auditors' judgment performance under the business risk audit approach?

An important objective of research in individual judgment and decision-making is the contribution to the improvement of the quality of the auditors' judgments. In Chapters 4 and 5 of this thesis the quality of the auditors' judgments has been measured in terms of accuracy (i.e., the level of conformity of the auditors' judgments compared to the expert panel's judgments) and consensus (i.e. the level of agreement among decision makers). While lack of consensus among a group of auditors implies that at least some of the auditors are not accurate, high consensus levels need not necessarily imply accurate judgments. In the context of 'assessment decisions' (as described in Chapter 5) accuracy, as measure of judgment performance is not feasible. Hence, it would be useful to know the empirical relationship between accuracy and consensus. Given the relatively high consensus levels (mean of .72 reported in Chapter 5), combined with the moderate accuracy levels (reported in Chapter 4), we would expect that there is no relationship between accuracy and consensus. Previous literature (e.g. Ashton, 1985), however, suggested that accuracy and consensus are highly positively associated to each other (a positive correlation of .84 was reported).

This section first describes the way how both measures of judgment performance have been made comparable to each other. Subsequently, the correlations between accuracy and consensus will be reported and conclusions will be formulated directed to dealing with judgment performance measures in future research.

Comparison of judgment performance measures Accuracy and Consensus

The judgment performance measures 'accuracy' and 'consensus' each measures an aspect of judgment performance. To the accuracy measure, as computed in this thesis, there is an external criterion available. Accuracy has been defined as the conformity of the individual auditors' judgments with the expert panel's judgments. To 'consensus', on the other hand, no external criterion is available. Consensus measures the agreement between auditors. Judgment performance as measured by consensus, hence, is not related to individual auditors but to groups of auditors.

In order to make both measures more comparable to each other, the accuracy measure has been changed from 'individual performance measure' to 'paired performance measure', based upon previous literature (Ashton, 1985). For each pair of auditors the

mean level of accuracy has been computed resulting in 3.570 mean accuracy scores. These scores have been adjusted for non-normality, using the Fisher r to Z transformation (comparable to the computation of consensus). Finally, the pair-wise accuracy (adjusted for Fisher r to Z transformation) scores have been correlated with the Fisher r to Z transformed consensus scores. This procedure has been performed for all four accuracy-scores (1. factor accuracy with respect to the identification of client's business risks; 2. weighting accuracy with respect to the identification of client's business risks; 3. factor accuracy with respect to the identification of client's entity-level internal controls and 4. weighting accuracy with respect to the identification of the client's entity-level internal controls).

Correlations between accuracy and consensus

Table 5.12 presents the results of these correlations.

Table 5.12 Pearson correlations between accuracy and consensus (2-tailed)

	Accuracy1	**Accuracy2**	**Accuracy3**	**Accuracy4**
Consensus auditors	-.118 (.000)*	-.023 (.161)	-.031 (.062)*	-.023 (.173)
Consensus students	.114 (.117)	-.074 (.309)	.201 (.005)*	.105 (.150)

With respect to auditors, all correlations between consensus and accuracy are (slightly) negative. This result contrasts with findings in previous literature (Ashton, 1985). As far as I am aware, Ashton's research related to the relationship between accuracy and consensus has never been replicated although related studies (e.g., Bonner, 1990) have been reported. Bonner (1990) examined both a cue selection task (judgment performance measured in terms of accuracy) and a cue assessment task (judgment performance measured in terms of consensus). This study, however, does not statistically compare the findings related to the accuracy and consensus measures. Other researchers (e.g. Shanteau, 1984) had the view that experts disagree with each other by nature, concluding that consensus as such can by no means be a measure of judgment performance. The findings presented in Table 5.12 deviate substantially from Ashton's (1985) findings. Table 5.12 suggests that high consensus levels in general are not associated with higher accuracy levels. Only for accuracy3 and accuracy4 in the student population, (slightly) positive correlations are reported. In my view, the relatively

low correlation levels imply that identification tasks and assessment tasks fundamentally differ from each other and are accompanied with different auditors' judgment biases[41]. In the identification task, the auditors' activities involve recall from prior experience and search for relevant information. Assessment tasks assume that relevant cues have already been identified and the information deemed relevant is processed into an assessment decision. The difference of the nature of the identification task and the assessment task is also clear from a decision aid perspective. Should the tasks be similar to each other, one could assume that judgment performance will increase with help of the same decision aids. In audit practice, however, identification tasks are, e.g., performed with use of (general or industry-specific) risk templates and team brainstorm-sessions, whereas judgment in a assessment task is primarily based upon experience (e.g. general experience in the auditing field, engagement-specific experience, task-specific experience, industry-specific experience, etc.)[42]. We, hence, argue that auditors having identified the wrong or less relevant risk factors, probably an ineffective audit approach will result. Also, the opposite might be true. E.g., relatively high accuracy levels are not accompanied with high consensus levels.

[41] E.g. Conlisk (1996) mentions amongst other limits on human unbounded rationality: the ignorance of relevant information (e.g. in the identification of client's business risk) and the use of irrelevant information (e.g. in assessing the impact of client's business risks on audit risk).

[42] Conlisk (1996) provides a meta-analysis of studies with mixed evidence related to the concept of bounded rationality. According to Conlisk there are a lot of researchers who do not question whether people are unboundedly rational. The question is whether they act approximately as if unboundedly rational. "Though people's rationality is bounded they learn optima through practice, in the end acting as if unboundedly rational". "People can learn from experience, suggesting how people come to act "as if" smarter than they are. However, the learning logic cuts both ways. Learning is promoted by favorable conditions such as rewards, repeated opportunities for practice, small deliberation cost at each repetition, good feedback, unchanging circumstances, and a simple context. Conversely, learning is hindered or blocked by the opposite conditions." In the context of this thesis, the relationship between general experience and feedback, on the one hand, and judgment performance, on the other hand, has been examined. The evidence presented suggests that general experience is not positively associated with judgment performance (in terms of accuracy and consensus) and that the level of feedback is positively associated with consensus, however, not with accuracy. From this study follows, hence, that the learning argument is partially favorably supported by feedback mechanisms (partially, because positive feedback effects were only found in an assessment task, not in the identification tasks).

Future research directed to accuracy / consensus

As stated in the previous section, researchers disagree about the appropriateness of the consensus measure in measuring the auditors' judgment performance. The results presented in this thesis also give rise to question the applicability of a consensus measure in judgment/decision-making research. From a practical point of view, however, there is a call for more transparency in audit files. Recently (2004), as a result of public scrutiny related to the quality of financial statements audits, the PCAOB issued new guidance with respect to the content of audit working papers. Independent reviewers, having reviewed the audit documentation, must reach the same conclusion as the preparer (or the audit team) has formulated. Audit firms more and more recognize the need for team sessions resulting in more uniformity and unity of audit conclusions. Additionally, the technical offices of the Big4 audit firms have changed the status of the technical office. Auditors, requesting consult from their technical office, are no longer free in their choice whether or not to agree with the conclusions formulated by the technical office. Technical offices have become directive instead of only consulting and sparring. Hence, the audit practice calls for more consensus in audit judgments/decisions. It might be expected that, from this perspective, the consensus measure might evolve from a 'confusing' measure to a 'standard' measure during time.

From a methodological perspective, both the accuracy measure and the consensus measure have their distinct advantages and disadvantages. E.g., the consensus measure lacks an external (validation) criterion; i.e., group judgments represent the best available solution. From the start of their career, however, auditors start becoming experienced and framed by the engagement-specific issues they experience although becoming experienced also contributes to improved auditor performance. In the real world, group audit judgments are not readily available as reference material to the individual auditor. In the audit practice, the circumstance that groups of auditors who actually decide on the same case-setting is rare. Making use of consensus measure in auditing research, hence, is not in conformity with the real auditors' world. However, the same "real world" is highly complex. Case-settings in auditing research are often simplified representations of this complex world. Indeed, the choice of (simplified) case-setting can be motivated by the phenomenon of 'bounded rationality' (which implies that even the auditors' professional judgment is accompanied with framing effects and sub-optimality), but a perfect external criterion which should be favorable to making use of accuracy measures is also not readily available or not available at all. There is at least one criterion that can be used to increase internal and external validation. This refers to actual (material) errors in the financial statements. Recently, some evidence has

become available of the relationship between the predictive value of audit risk assessments to financial statement errors. In my view, auditing research would improve making use of a combination of accuracy and consensus measures.
Recently, the first research studies regarding the auditors' judgments using the business-risk audit approach have been published and more studies on this topic can be expected. Audit researchers have become acquainted to the use of accuracy measures and consensus measures (although they are not often combined in a single study) in examining the traditional audit-risk based audit approaches. Longitudinal research, including a comparison of the traditional and modern audit approaches, should include both judgment performance measures.

5.7 Summary of empirical results related to the auditors' 'assessing the impact of client's business risks and entity-wide controls on audit risk'

Chapter 5 has described the empirical results related to the auditors' judgment performance in the task 'assessing the impact of client's business risks and entity-wide controls on audit risk'. Judgment performance has been measured in terms of judgment stability, consensus, cue usage and self-insight.
For audit managers an overall *judgment stability* has been reported of .93 (auditing students .96) which obviously is a high judgment stability. A significant positive correlation between stability and task-specific experience has been reported as well as a significant positive correlation between stability and the perceived level of feedback when conducting risk assessments. No significant correlation was found between stability and the auditor's risk-aversion.
For audit managers an overall *judgment consensus* of .72 (auditing students .64) has been reported, which, given the relative novelty of the task investigated, is reasonably high. Groups with higher levels of general experience in the auditing field showed a significantly lower judgment consensus compared to groups with lower levels of general experience (.75 versus .70). Regarding the impact of industry-specific experience, it was found that the group of audit managers with highest industry-specific experience (>= 1,000 hours of industry-specific experience) showed the lowest judgment consensus (.59), whereas the middle group of audit managers (between 250 and 500 hours of industry-specific experience) showed the highest judgment consensus (.78). On the other hand, it has been described that audit managers with the highest level of task-specific experience report the highest judgment consensus (.77) compared to groups with lower task-specific experience. Additionally, the group of audit managers with the

lowest level of perceived feedback showed the lowest judgment consensus (.68 and .66 respectively). Also it was found that the group of audit managers with the highest level of risk-aversion reported the lowest judgment consensus (.64). The reported direction (positive/negative) of the impact of industry-specific experience on judgment consensus was contrary to the direction as hypothesized. On the other hand, the direction of the impact of general experience, task-specific experience, and the perceived level of feedback on judgment consensus supported the direction as hypothesized.

Audit managers and auditing students particularly differed in their assessment of the cue weight related to the client's business risk 'strategic change: from normal homes to luxury villas'. Based on a linear regression model it was reported that the auditor's cue usage was particularly influenced by task-specific experience. In this model 'general experience' also significantly contributed to the auditor's cue usage, but this was mainly found to be present due to interaction effects with 'feedback' and 'risk-aversion'. This finding was corroborated by correlation analyses at individual case level. For individual cases, industry-specific experience significantly correlated (-.199) with case 1101 (where two client's business risks and one entity-level control was present). This significant correlation was particularly influenced by relatively lower impact assessments on cue 1 (financial condition significantly deteriorated) for more (industry-specific) experienced auditors. Task-specific experience significantly correlated with audit risk impact assessments in two cases: case0100 and case0111. These assessments were particularly influenced by higher impact on audit risk assessments for cue 2 (strategic change from normal homes to luxury villas). Finally, a significant negative correlation was found between the level of risk-aversion and the impact on audit risk assessment for case0001.

Audit managers overall reported a level of self-insight, measuring the correlation between objective and subjective cue weights, of .69 which is, given the relative novelty of the task content, reasonably high. Related to the impact of the independent variables on self-insight, no significant differences were reported across the distinguished sub-groups.

Finally, Chapter 5 investigated the coherence of the judgment performance measures 'accuracy' (Chapter 4) and 'consensus' (Chapter 5). A significant negative correlation was found between consensus on the one hand and accuracy1 (related to the identification of client's business risks) and accuracy3 (related to the identification of client's entity-wide controls) on the other hand.

6 Discussion

This final chapter contains a discussion of the research design used in this thesis and provides an overview of the findings related to the research questions and hypotheses. The main theme examined in this thesis relates to the auditor's judgment performance in conducting some specific tasks of the Business Risk Audit is associated. From this main theme, the following research questions were developed:

- Is the auditor's judgment performance associated with the auditor's level of experience, and if so to what extent? Three categories of experience were distinguished: general experience, industry-specific experience and task-specific experience.
- Is the auditor's judgment performance associated with the auditor's perceived level of feedback, and if so to what extent?
- Is the auditor's judgment performance associated with the auditor's level of risk-aversion, and if so to what extent?

6.1 Research design

6.1.1 Summary of research design

The research instrument was based on two pillars: (1) a research questionnaire (including a case-description of a company in the Construction industry and a debriefing questionnaire) and (2) an expert panel. The expert panel consisted of industry leaders of the Big 4 audit firms. The questionnaire consisted of two experiments: (1) an experiment related to the *identification* of client's business risks and client's entity-level controls, (2) an experiment related to the *assessment* of the impact of these risks and controls on audit risk. In other words, the two experiments reflected two specific tasks of the Business Risk Audit. For each of these experiments, the auditor's judgment performance was assessed related to the independent variables. In this regards, making use of an expert panel had a twofold functionality: (a) selection of cues used in the second experiment, and even more important (b) the response of the expert panel members were used as a benchmark in order to measure the auditor's judgment performance with respect to the first experiment. A discussion of the findings resulting from this empirical study will be provided in the next section. These results are

particularly of interest to the auditing profession, since all Big4 audit firms participated in the experiments.

6.2 Research findings

6.2.1 Judgment performance and experience

An important finding of this empirical study relates to the “expertise paradigm”. Prior research has produced mixed results regarding the impact of general experience on the auditor’s judgment performance. From approximately 1990 onwards, other research studies refined experience into general experience, task-specific experience and industry-specific experience, but none of these studies incorporated all three categories of experience. This thesis examined the individual impact of the three categories of experience on judgment performance as well as their interactions.

In Chapter 4 it was reported – related to the tasks ‘*identification* of client’s business risks and entity-level controls’ - that overall:

- *General experience* is not associated with the auditor’s judgment performance;
- *Industry-specific experience* is positively associated with the auditor’s judgment performance. Further analysis reveals that for the group of auditors with a level of industry-specific experience of between 0 and 1,000 hours (over three years) of industry-specific experience, industry-specific experience positively contributes to judgment performance and for respondents with more than 1,000 hours of industry-specific experience industry-specific experience is negatively associated with the auditor’s judgment performance.
- Contrary to our expectations, *task-specific experience* is negatively associated with judgment performance.

These findings present the impact of single independent variables on the auditor’s judgment performance. In a linear regression model, which incorporated all independent variables, it was reported that industry-specific experience is significantly associated with judgment performance, and general experience and task-specific experience are not significantly associated with the auditor’s judgment performance.

In Chapter 5, which described the findings related to the task '*assessment* of the impact of client's business risks and entity-level controls on audit risk', the following findings were reported:

- *General experience* shows some positive impact on the auditor's judgment performance;
- The relationship between *industry-specific experience* and judgment performance shows two peaks, namely for the group of auditors with no industry-specific experience and for the group of auditors with between 250 and 1,000 hours of industry-specific experience. The figure also shows two dips, namely for the group of auditors with between zero and 250 hours of industry-specific experience and for the group of auditors with more than 1,000 hours of industry-specific experience. The first peak may be explained by the absence of client-specific experience. The presence of client-specific experience can result in more biased judgment- and decision-making.
- *Task-specific experience* is positively associated with the auditor's judgment performance.

General experience and judgment performance

From this empirical study, it follows that general experience in the auditing field does not (see Chapter 4) contribute or contributes to a limited extent (see Chapter 5) to the auditor's judgment performance. This result is in accordance with our expectations, based on prior research. In an overview article, Trotman (1998) reported that prior studies on the impact of general experience on the auditor's judgment performance reported mixed results, i.e. both positive impact and negative impact were reported. A more recently conducted study related to the identification of risk factors task (Bedard and Graham, 2002), reported that general experience did not contribute to the auditor's judgment performance. It is argued in the current empirical study that the findings from the conducted experiments can be explained by the fact that an increase in auditors' general experience is accompanied by an increase in engagement-specific experience. Underlying this argument is the assumption that individual auditor's learning curves are at least to some extent unique and auditor's judgments may deviate from auditors' average judgments in comparable circumstances. As such, the findings suggest that general experience is not a good predictor of improved judgment performance.

Industry-specific experience and judgment performance

The empirical findings of this study revealed that industry-specific experience is positively associated with judgment performance both in an identification task and an assessment task. However, concerning the identification task, it was also reported that the positive association was related to respondents with industry-specific experience upwards to 1,000 hours of industry-specific experience over three years. From the level of 1,000 hours and higher, judgment performance tended to decline. An absolute number of 1,000 hours in general is quite low, since this equals 300 hours spend on industry-specific engagements on an annual basis, approximately one fifth of total productive hours on an annual basis. This implies that auditor with this level of industry-specific experience serve other industries for most of their available working period. It was argued that this level of industry-specific experience typically is caused by the type of industry. Auditors working in more regulated industries – like, e.g. the industries healthcare and financial services – regularly spend approximately 1,000 hours on an annual basis on industry-specific audit clients. Audit firms need to carefully consider the assignment of industry-specialized auditors to specific audit tasks. It may well be the case that auditors become less accurate and skeptical when spending too many hours on specific industries. Given the novelty of the Business Risk audit approach, prior research studies with which this empirical study directly can be compared, are not available. Prior research studies (e.g., Taylor 2001, Solomon *et al.*, 1999) directed towards the impact of industry-specific experience on judgment performance related to other audit tasks, reported a positive impact. The results reported in this empirical study deviate from prior research in this field in the sense that the auditor's judgment performance tends to increase up to some level of industry-specific experience, and tends to decline from this level of industry-specific experience.

Task-specific experience and judgment performance

The results of this empirical study showed contrary outcomes when comparing judgment performance in identification tasks and judgment performance in an assessment task. For identification tasks a negative association was found between task-specific experience and judgment performance, where more experienced groups of auditors performed better in an assessment task. Regarding the identification tasks these results are contrary to prior research, and regarding the assessment task these results are in accordance with prior research (Bonner 1990; Bonner and Lewis, 1990). A potential explanation may be that for identification tasks auditors 'suffer' from client-specific experiences. This threat is more applicable to identification tasks compared to

assessment tasks. In an identification task, auditors need to search for the most relevant information inputs in a variety of knowledge databases, and consider comparable circumstances they experienced with other clients. What may constitute a significant business risk for one audit client may not be a significant business risk for another audit client. In other words, experienced auditor's judgments may be biased by experiences with other clients. This bias is less prominent in assessment tasks, where the number of cues regularly is low. In addition, with assessment tasks the decision output is only a number or a risk-classification (low, medium, high). The variety of outputs is, hence, lower compared to identification tasks. A potential way of mitigating the auditor's judgment bias in identification tasks is to make use of generally applicable industry-specific templates of business risks and controls. This may be complemented with group-decision-making procedures instead of individual decision-making procedures, for example team-planning events before the audit starts.

6.2.2 Judgment performance and feedback

Consistent with prior research (e.g., Libby and Trotman, 1993; Ashton, 1990) we would have expected that feedback would contribute positively to the auditor's judgment performance. No significant results have been reported with respect to the identification tasks. Regarding the assessment task, judgment performance significantly increased with an increase in the perceived level of feedback except for the group with the highest level of perceived feedback (this group shows a slight decrease of .76 to .72). As a whole, our expectation with respect to the direction (positive) of the association was supported. It is, hence, suggested that feedback is a good mechanism for improving judgment performance. This result is somewhat surprising given the relatively low mean levels of feedback for audit managers (on a scale of 0 to 10 – sometimes to often – a mean level of feedback of 5.3 was reported). Generally, audit firms are strongly recommended to embed to a higher extent providing feedback in the audit process. US auditing standards (e.g., PCAOB AS2 and PCAOB AS3, 2004), require adequate supervision and review process during the audit from an audit quality perspective. So, feedback or review is important for all audit firms, but for Big4 – serving particularly SEC-clients – audit firms in particular. In the Dutch auditing profession, the importance of external file reviews (e.g., by AFM and CTK) tends to increase. In addition, the regulatory environment in the auditing profession is expected to change significantly with WTA ("Wet Toezicht Accountantskantoren"). Tan (1995) reported that announced reviews, as an ultimate type of (external) feedback, would positively contribute to the auditor's judgment performance as measured by consensus and self-insight. This

stresses the importance of both internal feedback (as an audit firm's control device) and the sufficiency of audit documentation.

6.2.3 Judgment performance and risk-aversion

In this empirical study, two identification tasks and an assessment task from the business risk audit approach were selected for the research design. These three tasks share the concept of risk: (business) risk identification, (business) risk mitigation, and (audit) risk assessment. As a final independent variable, the concept of general risk-aversion was included. Risk-aversion, in this thesis, is related to a more general attitude towards risk, which every single individual faces in day-to-day circumstances. Risk-aversion has been measured as the percentage of assurance a respondent needs when selecting an uncertain chance to win an amount compared to a fully certain event of winning a (lower) amount. The concept of risk-aversion does not have a relationship with the nature of business risks or the nature of entity-level controls. Hence, the association of judgment performance with risk-aversion was not examined for the identification tasks. For the assessment task, the related hypothesis expected that respondents, who are more risk-averse, make decisions moving away from the average decision outcome, which implies a lower level of consensus. The statistical results supported our expectations. In order to keep audit quality at a high level, a high level of judgment performance (as measured by consensus) is necessary to audit firms. Based on these research findings, it is suggested that audit firms need to be aware of the fact that auditors in conducting audit tasks have different general risk perceptions. These general risk perceptions potentially result in different audit risk assessments. Audit firms are recommended to develop criteria related to audit risk assessments. This may be realized by developing a knowledge database incorporating audit risk assessments from existing audit engagements including references to the specific audit environment in terms of business risk factors, inherent risk factors and control risk factors.

6.3 Judgment performance and the 'Business Risk audit approach'

This empirical study was directed towards the examination of judgment performance in two important audit tasks for which the 'business risk audit approach' differs from the more traditional 'audit risk based audit approach'. The following two sub-sections discuss the auditors' judgment performance related to these tasks.

6.3.1 Identification tasks

Client's business risks

Related to the 'identification of client's business risks task' Table 4.1 reports a mean judgment performance of 2.5 (accuracy 1). Accuracy 1 measures the number of client's business risks identified by auditors which match with the expert panel's list of business risks. Compared to the optimum of 5.0, Table 4.1 suggests that substantial room for improvement of judgment performance is left. In addition to the independent variables examined in this empirical study, the relative novelty of the task, the task complexity, and the impact of client-specific experiences are potential reasons for the relatively low average judgment performance. Audit firms may consider designing decision-aids which guide the auditor's judgment- and decision-making processes. Industry-specific knowledge databases in general and templates of industry-wide significant business risks in particular are an example of decision-aids.

Client's entity-level controls

Related to the 'identification of client's entity-level controls task' Table 4.1 reports a mean judgment performance of 3.68 (accuracy 3). Accuracy 3 measures the number of client's entity-level controls identified by auditors matching with the expert panel's list of entity-level controls. Compared to the mean auditor's judgment performance in the 'identification of client's business risk task', the auditor's judgment performance for this task is substantially higher. It can be argued that auditors the identification of controls is less novel to auditors compared to the identification of controls since auditors get experienced in this area in an early stage in the auditing education. In addition, the client's system of internal controls is probably more stable when compared to the dynamics of the risk environment. Auditors can, however, still realize improvement in judgment performance. The use of decision aids and team-wide discussions on the client's system of controls may be helpful in realizing gains in judgment performance.

6.3.2 Assessment task

The audit risk assessment task is – compared to the identification tasks – less complex and probably less novel since the decision output is the same, namely an audit risk decision. The audit risk model is also used in the more traditional audit approaches. It is therefore not surprising that the mean levels of judgment performance are in conformity with prior research related to the audit risk model judgments (e.g., Ashton, 1973). This empirical study reports a mean level of consensus of .72. An observation from this

study, see Table 4.3, is that auditors' level of feedback related to audit risk decisions is relatively low. A mean level of feedback of 5.27 is reported, measured on a scale from 0 (never), to 10 (always) is reported. Additional analysis, see Table 5.5, shows that judgment generally increases with an increase in feedback. It is, hence, suggested that audit firms would consider providing more feedback to auditors when making audit risk assessment decisions.

6.4 Limitations of this empirical study

The research findings – discussed in the previous section – should be viewed taking into account the limitations which are present in this empirical study.

Identification tasks

The focal point of this study is the auditors' judgment performance. The auditors' judgment performance is measured for the business risks- and entity-level controls identification task by the variable Accuracy. Accuracy is measured by comparing the participants' judgments with judgments of an expert panel. Other empirical studies make use of experiments in which an optimum judgment is calculated which serves as a benchmark for calculating the level of professional judgments of other experiment participants. For example, in experiments where judgment performance is measured by the number of risks or controls identified. In the current empirical study, it was not possible to make use of this measure of judgment performance, since the number of risks and controls to be identified was limited to a maximum of five risks and controls. I.e. the number of identified risks and controls does not tell us to what extent an auditor shows a high or a low level of judgment performance. Instead, the quality of the identified risks and controls was measured by making use of an external benchmark, namely the expert panel judgments.

Another limitation of this study is related to the previous one. The questionnaire, used in the expert panel meeting, provided the experts initially with a response format in which the four experts were requested to individually identify the five business risks deemed most important to the case-setting. This procedure resulted in a list of fifteen business risks. For these fifteen business risks the experts were asked to allocate 100 points of importance to each of these fifteen business risks. The participants in the experiment on the other hand have been asked to identify a maximum of five most important business

risks. The (weighting) accuracy-scores of participants were calculated by comparing the participants' allocation of 100 points to five business risks to the expert panel's allocation of 100 points to fifteen business risks. This implied that a skewed distribution would have resulted when the (weighting) accuracy would have been calculated by rewarding the participant with the expert panel points (out of 100) for each of the identified business risks identified by the participant that matched with a business risk identified by the expert panel. To (partially) mitigate this measurement issue, I have decided to measure (weighting) Accuracy by multiplying the participant's importance points with the respective expert panel's importance points for matching business risks. With hind-sight, it can be stated that the procedure chosen in this empirical study turned out to be more complex than necessary. For future research it is recommended to design exactly the same procedure for expert panel and experiment. This may be realized by requesting the individual expert panelists to apply rankings (1-5) to the total list of risks identified by the expert panel. After this step, the researcher is able to derive a list of five risks which are the most important from the expert panel perspective. A subsequent procedure for the expert panelists may be to individually allocate 100 points to these five risks. The means of allocated points may serve as an appropriate benchmark to which the experiment participants may be related. In this example design, it is assumed that the experiment design procedures remain unchanged compared to the one used in the current empirical study.

Assessment task

The second experiment was concerned with the auditors' judgment performance in an audit risk assessment task. The research design was based on the so-called Lens model, which is regularly used in judgment and decision-making studies across a variety of disciplines. An explicit choice in designing this kind of experiments is concerned with the number of cues to incorporate in the experiment. From prior research in the cognitive psychology discipline, it is known that the number of cues individuals can effectively incorporate in their judgment and decision-making is very limited. This was used as a basic argument to select a number of only four cues for the experiment in this empirical study which resulted in a 2^4 factorial design or in fifteen cases. These fifteen cases were presented to all participants in the experiment. In order to investigate the potential risk of participant's fatigue or boredom, the questionnaires were distributed making use of three different sequences of cue combinations. The empirical results showed that – to a limited extent – case sequence had impact on the level of consensus, average consensus across three groups of participants ranging from .70 to

.73. This suggests that participants indeed may have experienced that the questionnaire in this format was too long, although this argument was never put forward by participants in the debriefing questionnaire. I have assumed that positive and negative deviations due to the various case sequences have compensated each other, based on the argument that the two basic case sequence materials were entirely opposite to each other: the first case sequence starting with a case in which all cues were present and the second case sequence starting with a case in which only one cue was present. Future research studies may take into consideration the lengthiness of the questionnaire and the number of cues to be included in the experiment.

6.5 Opportunities for future research

Research design

The selected research design turned out to be both an efficient way of gathering data and an effective way in studying the research questions of this thesis. In addition, including an expert panel of industry leaders in the research design contributed in my view to existing research methodologies when studying the potential effect of the auditor's level of industry-expertise. This suggests that in future research the selection of expert panel members needs to carefully consider the extent to which this selection comes close to the definition of expert judgments. Experts need to be individuals which obviously show the highest possible level of judgment performance. Future research studies may be directed towards categorization of audit tasks of the Business Risk Audit, for example like Abdolmohammadi, 1999) including the (functional) levels of auditors who conduct these tasks. Based upon such a categorization, future research may be able to more properly select: (1) the target population of auditors, and (2) the composition of an expert panel, specifically when examining the effect of task-specific experience on the auditor's judgment performance.

Further improvements in research design may be achieved when the research design makes use of actual client settings, instead of a hypothetical case description.

Research findings

Implications for "expertise paradigm"

As mentioned, this study is the first empirical study incorporating three categories of experience. By integrating these categories into one study and examining the impact of experience on two different audit tasks in a new research field (i.e., the business risk audit), new research knowledge originated from this study. For example, the finding that only industry-specific experience explains the quality of the auditors' judgments (to a certain extent) in an identification task, where general experience and task-specific experience are not associated with the auditor's judgment performance. In other words, both the nature and the size of experience influence the quality of the auditor's judgments. Future empirical studies have many opportunities to extend this research area. For example, other studies may examine the auditor's judgment performance when conducting other audit tasks of the business risk audit approach (e.g., assessing the implications of identified business risks to actual working programs and substantive testing). Additionally, future empirical studies may further examine the skills and knowledge related to each category of experience. E.g., in this thesis industry-specific experience has been examined as a measure of expertise related to audit tasks, but it may well be the case that the objective of audit firm's industry-specialization is also driven by other factors like marketing arguments, fee improvements, etc. Consider for example the marketing argument. Audit firms may want to show their industry knowledge to existing and potential audit clients. The question in this regard is what this industry knowledge really consists of. Is this knowledge related to competitor performance in the industry, market positioning of the client, identification of potential differences in accounting treatment of industry-specific financial statement accounts, etc. This type of research may yield more insight into the relationship between industry-specific experience and judgment performance in specific audit tasks, e.g. the task 'high-level review of financial statements including disclosures').

This empirical study revealed that – regarding the identification tasks – industry-specific experience contributed to the auditor's judgment performance where general experience and task-specific experience did not contribute to the auditor's judgment performance. Industry-specific experience in this empirical study related to the construction industry. Organization along service lines, at least for Big4 audit firms, is still at hand. It would be of interest to investigate in future research whether and to what extent the results of this study can be generalized to other industries.

Appendix A: Research materials expert panel meeting (2003)

Introduction

Before the expert panel took place in 2003, the expert panelists received a confirmation letter of their attendance at the expert panel meeting. The meeting started with a short introduction by the researcher on the primary objectives of the meeting. Thereafter, they were provided with a case-description of a hypothetical audit client in the construction industry.

Case-description

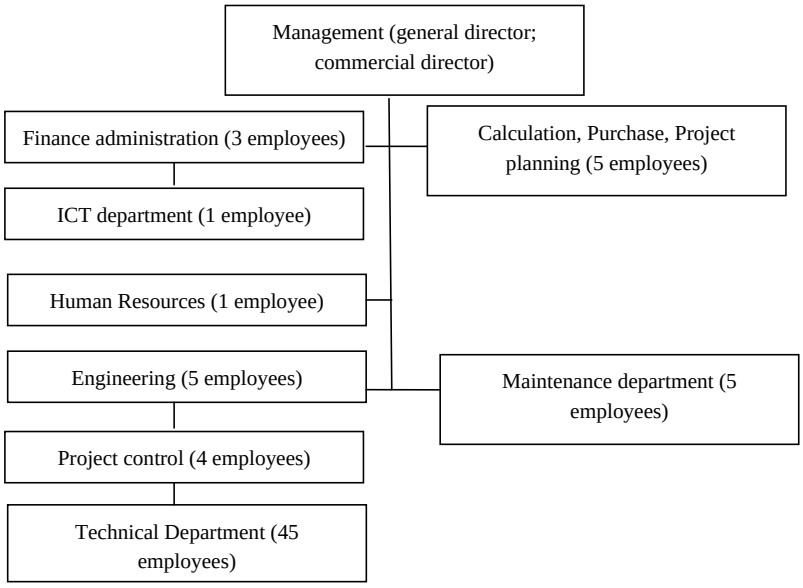
Case introduction

Since ten years you have been engaged to the financial statement audit of construction company ABC. Currently, it is April 1, 2002. In the near future, the interim (process) audit will start and now you are preparing this audit by considering the most important points of attention relevant to the audit. Until now, you have conducted a systems-based audit approach, based upon risk assessments. You have always been able to provide an unqualified audit opinion, without notable discussion issues in the discussion meeting with client management. As a result, you have always delivered a short-sized management letter.

Organization chart of construction company ABC

Construction company ABC B.V. is a medium-sized construction company, with operations in the centre of The Netherlands, and executes primarily regular projects in the segments ‘civil constructions’ and ‘commercial/industrial buildings’. In 2001 revenues were generated of approximately € 50 million with a positive net result of € 1 million (2%). In recent years, both revenues and net result were consolidated at the current levels. Construction company ABC has organized the firm as follows:

ORGANIZATION CHART CONSTRUCTION COMPANY ABC



Objectives and strategy of the company

Construction company ABC B.V. was founded 40 years ago by the father of the current general director. Since then, the company has gradually expanded to her current size. Formalized objectives and strategies have never been put on paper. At local billboards the company regularly advertised with the slogan ‘ABC aims for the lowest costs’. The founder’s device was always: ‘we perform those activities where we have always excelled in’. The commercial director regularly gets into contact with the five most important principals in the region.

Projects

Projects are characterized by serial production. Projects are regularly executed with fixed fee contracts. The duration of the projects is two years at a maximum.

Processes
Having received a request for proposal the Calculation department prepares the calculation, which is based on the project specifications. This calculation takes into account a premium of 1% with respect to general risks (this percentage is based on experience). After being engaged by the principal the calculations are further specified, the project is planned, a project-number is opened in the project-administration and the contract is prepared.

Based on the detailed project forecast the Purchase Department enters into contracts with suppliers (materials) and with sub-contractors.

The forecasted and realized costs and revenues are recorded in the project-administration which is part of the finance administration. The costs include direct labor hours and all directly attributable travel and accommodation expenses of the employees (base don weekly timesheets). Recorded hour rates are task- and function dependent and are based on the yearly forecasts of the company. All materials used are recorded on specific project-engagement numbers by employees of the finance department.

Deviations of original contract
Contract-variations are executed after oral assignment by the principal. Only in cases where the contract-deviations are substantial a new project-forecast is prepared. Because of his frequent contacts with the principal and project-managers the general director is rapidly informed on specific developments regarding the projects in execution.

Project funding
Results realized in the past have annually been passed to private accounts of the company's founder. From the time of the sale of the company from the founder to his son some years ago, the current general director has aimed to raise the company's capital to a required minimum level. As can be seen from the Appendix (financial information) this objective has reasonably been realized in the meantime.

Safety and environmental issues
Construction company ABC strives for good working condition regarding her employees and complies with all relevant rules and regulations with respect healthiness, safety and environmental conditions. Illness percentages are low and in recent years no specific accidents occurred.

ICT
The level of computerization is low.

Management information
Periodically a financial overview per project is being composed based on calculations, receipts of goods received, time-sheets and production reports. The financial overview contains a comparison between forecasted and realized costs per project phase (which takes into account the contract deviations) and also shows the invoiced installments. In addition, the general director periodically receives an overview of the realized general costs (compared to the budgeted costs). The general director only consults the manager of the Finance department only in case this overview shows striking deviations between forecast and realization. The commercial director himself is responsible for regularly contacting the principals and regularly visits projects in execution.

Financial information construction company ABC B.V.

Balance sheet as at December 31
(* € 1,000)

	Forecast December 31, 2002		December 31, 2001	
Fixed assets				
Tangible fixed assets		500		500
Current assets				
Equipment	400		350	
Work in Progress	10,000		8,300	
Trade receivables	100		100	
Other current assets	50		250	
		10,550		9,000
Cash and cash equivalents		450		500
Total assets		11,500		10,000
Equity		8,000		7,000
Provisions		1,500		1,500
Long-term liabilities		1,000		900
Current liabilities		1,000		600
Total liabilities		11,500		10,000

Profit and loss
(* € 1,000)

	Forecast 2002	2001	2002	2001
	€	€	%	%
Revenues				
Net revenues	48,000	48,900	96.00%	97.80%
Change WIP	1,700	1,000	3.40%	2.00%
Other revenues	300	100	0.60%	0.20%
	50,000	50,000	100.00%	100.00%
Costs				
Costs of materials	41,000	41,210	82.00%	82.40%
Salaries	3,940	3,700	7.90%	7.40%
Depreciation fixed assets	100	100	0.20%	0.20%
Other costs	3,360	3,400	6.70%	6.80%
	48,400	48,410	96.80%	96.80%
	1,600	1,590	3.20%	3.20%
Financing expenses	-60	-50	-0.10%	-0.10%
Pre-tax income	1,540	1,540	3.10%	3.10%
Tax	-540	-540	-1.10%	-1.10%
Net result	1,000	1,000	2.00%	2.00%

Task 1 Identification of client's business risks

Definition business risk: A business risks is a risk that threatens the realization of the company's strategy/objectives.

Task: **Identify based on the case-description the most important client's business risks (maximum of five) which are relevant to the audit of the financial statement account Work in Progress. Please, be as specific as possible.**

Explanation:
Amongst other things, you can think about elements of the company's business environment or business risks present in internal processes.

Top 5 of business risks relevant to the account Work in Progress

1.
2.
3.
4.
5.

Task 2 assess relevance of client's business risks

All business risks you and your expert colleagues identified as top prioritized client's business risks relevant to the account Work in Progress (Task 1) are presented below.

Task: Assess the relevance with respect to the account Work in Progress of each of the business risks presented below.

You are requested to distribute 100 points of relevance across each of the business risks (the more points you assign to a risk, the more relevance this risk is).

Business risk	**Relevance assessment**
Due to focus on 'low costs' risk for long-term profitability	
Due to focus on 'low costs' risk of rate control	
Project mismanagement related to projects for which the company does not have the required experience	
Due to informal culture nobody is responsible for differences between forecast and realization	
Exit of key personnel	
Contract-deviations related to commercial process	
Control of contract-deviations versus formalization of deviations	
ICT and internal controls	
Stable, small margins regarding current activities	
Dominant general director	
Control of general costs	
Incomplete/inaccurate project reports	
Purchase-risk due to late planning (after contract specifications have been prepared)	
Responsibility regarding project-status reports	
Calculation errors made by calculation department	
	Sum = 100

Task 3 Identification of most effective client's entity-level controls

In the preceding tasks you have identified the most important client's business risks related to the case-description. In addition you have assessed the relevance of these business risks regarding their impact on the financial statement account Work in Progress. The business risks identified by you have been presented below.

Task: **Identify for each business risk the most effective entity-level control. Be as specific as possible.**

Business risks	*Most effective entity-level controls*
Due to focus on 'low costs' risk for long-term profitability	
Due to focus on 'low costs' risk of rate control	
Project mismanagement related to projects for which the company does not have the required experience	
Due to informal culture nobody is responsible for differences between forecast and realization	
Exit of key personnel	
Contract-deviations related to commercial process	
Control of contract-deviations versus formalization of deviations	
ICT and internal controls	
Stable, small margins regarding current activities	
Dominant general director	
Control of general costs	
Incomplete/inaccurate project reports	
Purchase-risk due to late planning (after contract specifications have been prepared)	
Responsibility regarding project-status reports	
Calculation errors made by calculation department	

Task 4: assess effectiveness of client's entity-level controls

In the previous task you and your expert colleagues have identified the client's most effective entity-level controls. A full list of these entity-level controls is presented below.

Task: Assess the relative effectiveness of each of the entity-level controls in mitigating the identified business risks.

You are requested to distribute 100 points across the various entity-level controls. The more points you attribute to a single control, the more effective you perceive this single control.

Entity-level controls	Assessment of relative effectiveness
Performance indicator: return on sales	
Communication of business policy	
HR management	
Shareholder value	
Experience of Calculation Department	
Project control report	
Code of conduct, performance evaluation system	
Employee satisfaction measurement	
Margin instructions	
Description of organizational procedures	
Supervision by Supervisory Board	
Budgeting procedures	
Main contracts with suppliers	
Supervision on Calculation Department	
Effective project-calculation ex post	
Code of conduct related to project-evaluation	
Promote culture and commitment to business policy	
Procedure notification and registration of projects	
Adequate analysis of general costs	
Explicit feedback to those responsible for projects	
Monitor the relationship with key personnel	
	Sum = 100

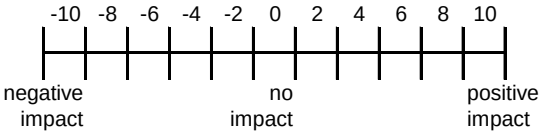
Task 5 Assess the impact of new client's business risks on audit risk Work in Progress

The previous four tasks were related to the case-description of construction company ABC B.V. From Task 5 and following, you are provided with new information.

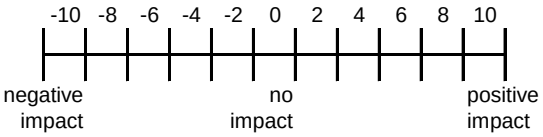
Task: **On each page[43] you are provided with a new occurred client's business risk. You are requested to assess each single business risk (i.e., without taking into account previously presented business risks). You are requested to assess the impact of each single business risk on audit risk of the financial statement account Work in Progress. A positive impact implies an increased risk of errors. A negative impact implies a decreased risk of errors.**

In addition, you are requested to mark in the margin of the page if you consider the presented business risk to be only of relevance to the construction industry.

1. **The quality of sub-contractors decreases with 10% compared to previous year.**

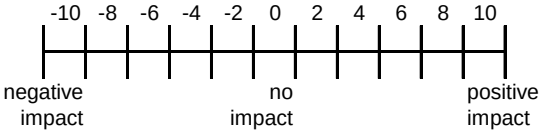


2. **An existing competitor of construction company ABC goes bankrupt (number of competitors decreases from five to four competitors).**

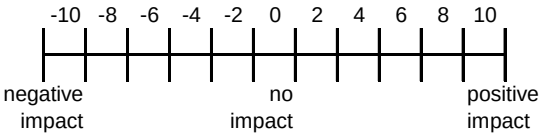


[43] For reasons of "saving trees" the business risks are in this Appendix not presented on separate pages.

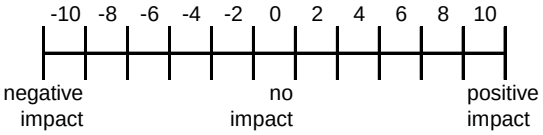
3. **The financial position of construction company ABC dramatically deteriorates.**



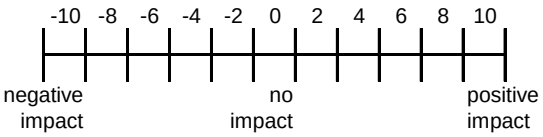
4. **Costs of materials and sub-contractors decrease with 10% due to market developments**



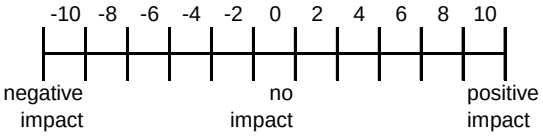
5. **Construction company ABC changes her strategy: from regular constructions to the construction of luxury villas.**



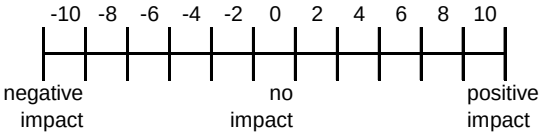
6. **The engagement portfolio of construction company ABC decreases with 25% compared to previous year.**



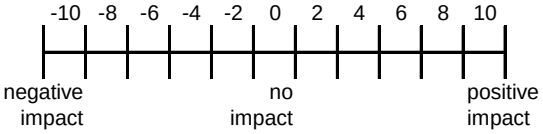
7. **A new competitor enters the business market place (from five to 6 competitors).**



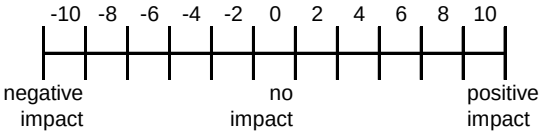
8. Costs of materials and sub-contractors increase with 10% due to market developments.



9. Sub-contractors' quality increases with 10% compared to previous year.



10. The engagement portfolio of construction company ABC increases with 25% compared to previous year.



Task 6: Identify the most effective entity-level controls in mitigating new client's business risks

In Task 5 you have assessed the impact of new occurred client's business risks on audit risk of the financial statement account Work in Progress. The table below presents these ten new occurred business risks.

Task: **Identify for each of the single business risks the most effective entity-level controls**

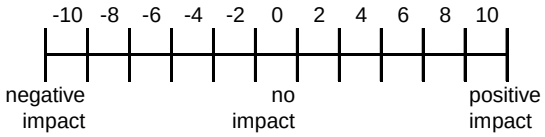
Client's business risks	Most effective entity-level control
The quality of sub-contractors decreases with 10% compared to previous year.	
An existing competitor of construction company ABC goes bankrupt (number of competitors decreases from five to four competitors).	
The financial position of construction company ABC dramatically deteriorates.	
Costs of materials and sub-contractors decrease with 10% due to market developments	
Construction company ABC changes her strategy: from regular constructions to the construction of luxury villas.	
The engagement portfolio of construction company ABC decreases with 25% compared to previous year.	
A new competitor enters the business market place (from five to 6 competitors).	
Costs of materials and sub-contractors increase with 10% due to market developments.	
Sub-contractors' quality increases with 10% compared to previous year.	
The engagement portfolio of construction company ABC increases with 25% compared to previous year.	

Task 7: Assess the impact of new identified entity-level controls on audit risk of the financial statement account Work in Progress

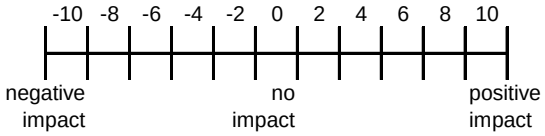
In Task 6 you and your expert colleagues have identified the most effective entity-level controls in mitigating the new occurred client's business risks.

Task: Assess the impact of the identified entity-level controls on audit risk for the financial statement account Work in Progress. A positive impact implies an increased risk of errors. A negative impact implies a decreased risk of errors.

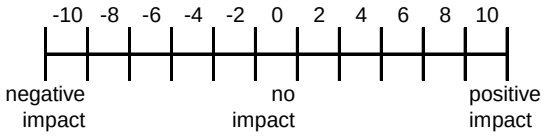
1. Reconsider/tighten contracts with sub-contractors



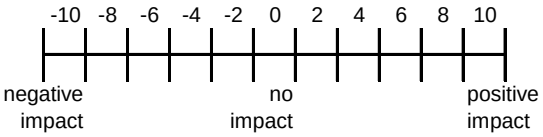
2. Reconsider business market-place



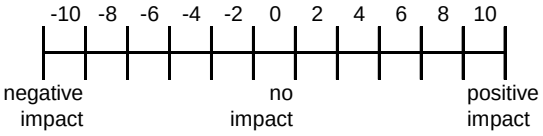
3. Root cause analysis of deteriorated financial position



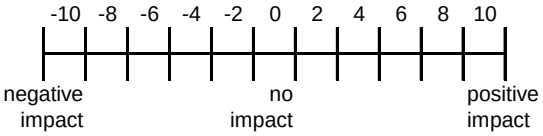
4. Reconsider pricing during negotiation with principals



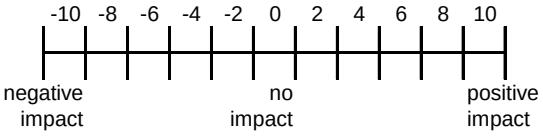
5. Assign qualified personnel to projects



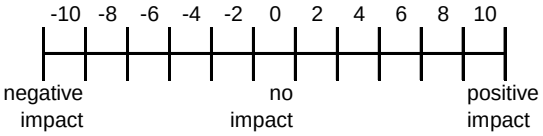
6. Root cause analysis underlying decreasing engagement portfolio and re-align organization



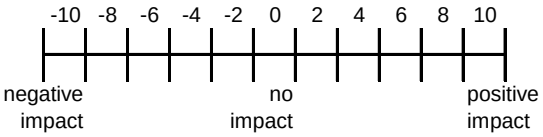
7. Charge cost-increases (materials, sub-contractors) to the principals



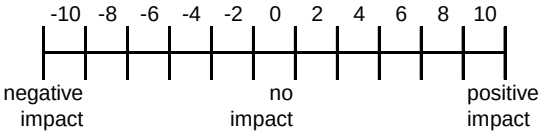
8. Due to increase engagement portfolio, reconsider employee planning



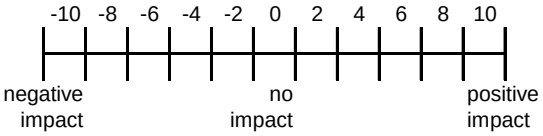
9. Strategic monitoring of market-positioning



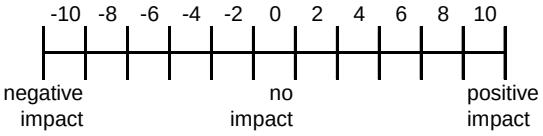
10. Improve relationships with banking institutions



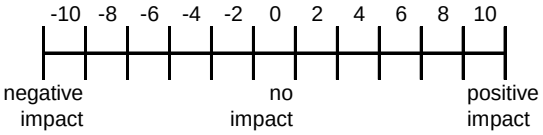
11. Planned hedge of purchase obligations



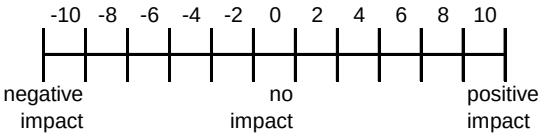
12. Management of product knowledge/experience



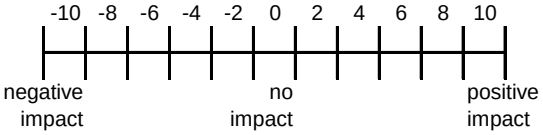
13. Create flexible cost-basis when engagement-portfolio decreases



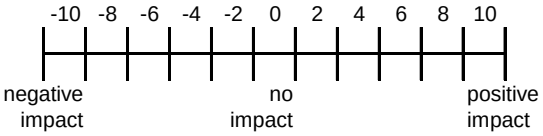
14. Analysis of market position



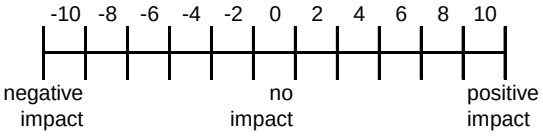
15. Contract-management and fee clauses



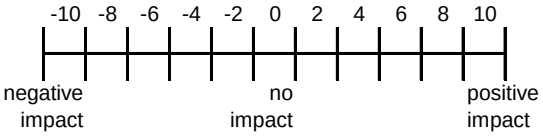
16. Transparent delivery conditions



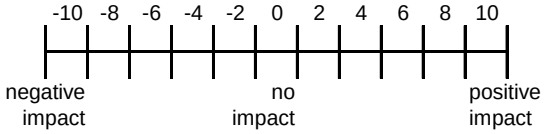
17. Develop commercial strategic objectives/policy statement



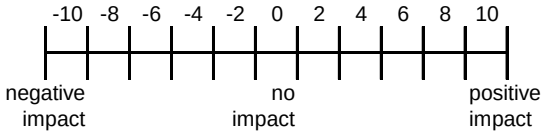
18. Financial rolling forecast



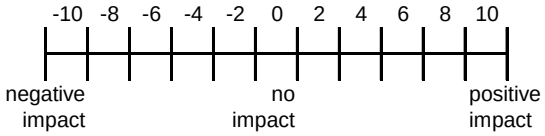
19. Refine procedures regarding proposals



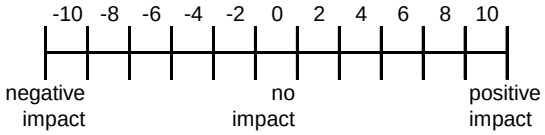
20. Adjust operational planning after strategic change



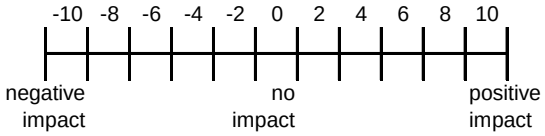
21. Tightening conditions of delivery relating to suppliers



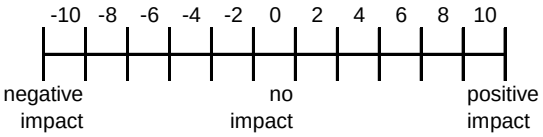
22. Charge cost-increases to principals



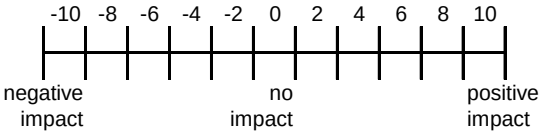
23. Adjust Quality Control manual and other internal control procedures



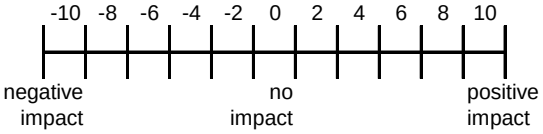
24. Improve margin-instruction when engagement portfolio decreases



25. Tightening project control when financial condition deteriorates



26. Hire external expertise when strategy changes from regular constructions to luxury villas



Appendix B: Questionnaire and debriefing questionnaire

This Appendix consists of four parts:
- Introductory letter to experiment participants;
- Case-description of hypothetical client;
- Research questionnaire;
- Debriefing questionnaire.

Introductory letter to experiment participants

Dear participant,

Please find attached the following documents:
1. Case-description
2. Questionnaire (including a debriefing questionnaire)

Case-description

Before completing the tasks of the questionnaire, please read the case-description of construction company ABC. The objective of the case-description is to outline a real-world setting of an audit client through which participants get a shared reference.

Questionnaire

The questionnaire contains four sub-tasks:
1. The identification of business risks;
2. The identification of entity-level controls;
3. Weighing the impact of business risks on the risk of material errors relating to a specific financial statement account;
4. Weighing the impact of entity-level controls on the risk of material errors relating to a specific financial statement account.

When completing the questionnaire, the following instructions are applicable:
- You are kindly requested to complete all questions in order to make your response useful in statistical analyses.

- You are requested to complete the questionnaire on your own, which means:
    - Without consulting of colleagues;
    - Without consulting of other decision aids like checklists etcetera.
- You are requested to complete the questionnaire in the sequence the questionnaire is presented to you. This means that you are requested to complete the questionnaire without looking back to previous questions and answers.
- Completion of the debriefing questionnaire (attached to the questionnaire) is of crucial importance to the interpretation of the results of this empirical study.

The empirical results will be presented in a way that they cannot be tied back to individual scores of the respondents.

For the sake of completeness we have added a glossary concerning returning concepts.

Glossary

Business risk

"A business risk is the risk that client management does not realize the company's objectives".

Explanation: the concept of 'business risk' does not refer to the so-called auditors' business risk (business risks the auditor is exposed to) but the so-called client's business risk (business risks audit clients are exposed to).

Entity-level control (= definition of internal control based on COSO, 1992)

"An entity-level control is a process – effected by an entity's board of directors, management and other personnel, designed to provide reasonable assurance regarding the achievement of objectives in the following categories:

- Effectiveness and efficiency of operations;
- Reliability of financial reporting;
- Compliance with applicable laws and regulations;
- Safeguarding of assets."

Risk-analysis (risk of errors in financial statement accounts)

Risk-analysis in this empirical study is meant as the combined analysis of inherent risk and control risk, which is conducted during the planning phase of the audit.

"**Inherent risk**" is the susceptibility of an assertion to a misstatement that could be material, either individually or when aggregated with other misstatements, assuming that there are no related controls.

"**Control risk**" is the risk that a misstatement that could occur in an assertion and that could be material, either individually or when aggregated with other misstatements, will not be prevented, or detected and corrected, on a timely basis by the entity's internal control.

Case-description

Refer to Appendix A.

Research questionnaire

Task 1: Identification of business risks

This task consists of two sub-tasks:

1 Describe in concise wordings the ***top 5 of business*** which you deem important when conducting the 2002 financial statement audit. Describe these risks in the first column of the table below.

2 Assess subsequently in the second column the relevance of each of these business risks for the hypothetical client as described in the case-description. In this column you are requested to distribute 100 points of relevance across the five business risks. The more points you attribute to a business risk, the more relevant you deem this business risk.

Note: The definition of Business risk in this empirical study is described in the glossary (see introduction letter).

Business risk	**Relevance assessment**
1.	
2.	
3.	
4.	
5.	
	Sum = 100

Task 2: Identification of entity-level controls

This task consists of two sub-tasks:

1. Describe in concise wordings the ***top 5 of entity-level controls*** mitigating the business risks of the hypothetical client most effectively. Describe these controls in the first column of the table presented below.
2. Assess the relative level of effectiveness of each of the entity-level controls to the hypothetical client. You are requested to distribute in the second column 100 points of relative effectiveness across each of the entity-level controls. The more points you attribute to a specific entity-level control, the more effective you deem this entity-level control.

Note: the definition of entity-level control used in this empirical study has been described in the glossary (see introduction letter)

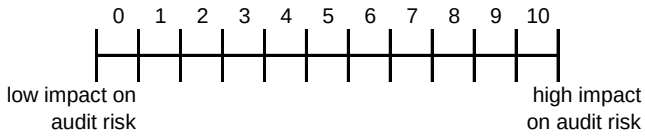
Entity-level control	**Effectiveness assessment**
1.	
2.	
3.	
4.	
5.	
	Sum = 100

Task 3 assessment audit risk of financial statement account work in progress

Task:

Assess, based on the information provided in the case-description, the level of audit risk for the financial statement account Work in Progress.

Response:



Task 4[44]: Impact of business risks on audit risk of the financial statement account Work in Progress

Introduction:

In each of the sub-tasks 4.1 to 4.3 you are requested to use the case-description as starting position. Assume you receive from client management in the meeting preceding the interim audit a number of new information-elements (business risks). These information-elements differ across sub-tasks 4.1, 4.2 and 4.3. You are requested to assess each sub-task as an isolated situation. From the pilot-tests of this empirical study there was evidence that spontaneous responses are regularly of qualitative high-level; you may, hence, need little time to complete these sub-tasks.

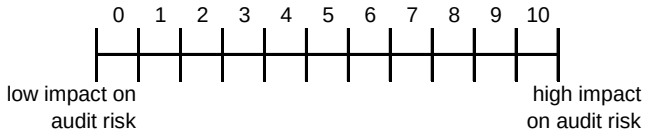
Task 4.1:

In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you as follows:

"The financial position of the construction company dramatically deteriorated".

[44] In the questionnaire used during the experiment, each new task was presented on a separate page. For reasons of "saving trees" the tasks are not presented on separate pages in this Appendix.

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?

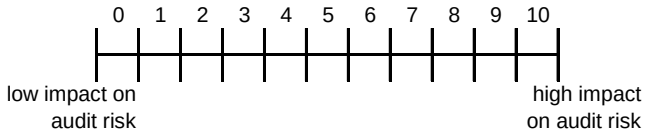


Task 4.2:

In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you as follows:

“Recently we have changed the company’s strategy from the construction of regular buildings to luxury villas.”

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?



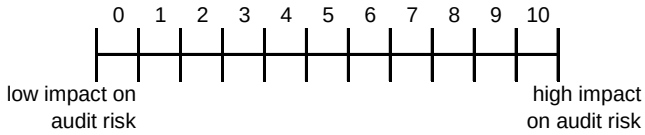
Task 4.3:

In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you as follows:

“Recently we have changed the company’s strategy from the construction of regular buildings to luxury villas.”

“In addition, the financial position of our construction company dramatically deteriorated”.

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?



Task 5: assessment of the impact of business risks and entity-level controls on audit risk concerning the financial statement account Work in Progress

Introduction:

In each of the sub-tasks 5.1 to 5.19 you are requested to use the case-description as starting position. Assume you receive from client management in the meeting preceding the interim audit a number of new information-elements (business risks and entity-level controls). These information-elements differ across sub-tasks 5.1 to 5.19. You are requested to assess each sub-task as an isolated situation. From the pilot-tests of this empirical study there was evidence that spontaneous responses are regularly of qualitative high-level; you may, hence, need little time to complete these sub-tasks.

Task 5.1:

In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you as follows:

“Recently we have changed the company’s strategy from the construction of regular buildings to luxury villas.”

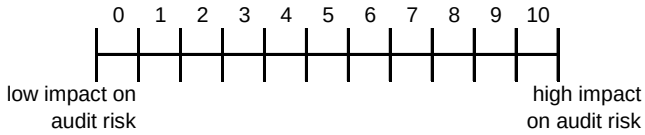
“In addition, the financial position of the construction company dramatically deteriorated”.

Additionally, client management tells you that the following entity-level controls have been implemented:

“The project control has been tightened by project control reports”.

“More specialized personnel has been assigned to projects”.

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?



Task 5.2:

In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you as follows:

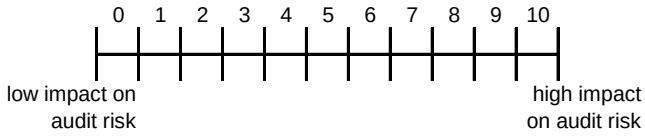
“Recently we have changed the company’s strategy from the construction of regular buildings to luxury villas.”

“In addition, the financial position of the construction company dramatically deteriorated”.

Additionally, client management tells you that the following entity-level control has been implemented:

“The project control has been tightened by project control reports”.

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?



Task 5.3:

In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you as follows:

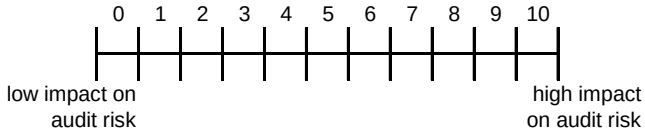
“Recently we have changed the company’s strategy from the construction of regular buildings to luxury villas.”

“In addition, the financial position of the construction company dramatically deteriorated”.

Additionally, client management tells you that the following entity-level control has been implemented:

“More specialized personnel has been assigned to projects”.

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?



Task 5.4:

In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you as follows:

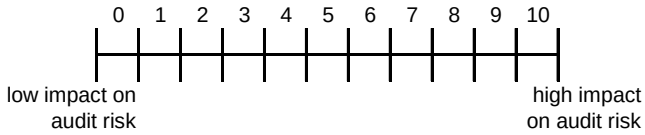
“The financial position of the construction company dramatically deteriorated”.

Additionally, client management tells you that the following entity-level controls have been implemented:

“The project control has been tightened by project control reports”.

“More specialized personnel has been assigned to projects”.

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?



Task 5.5:

In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you as follows:

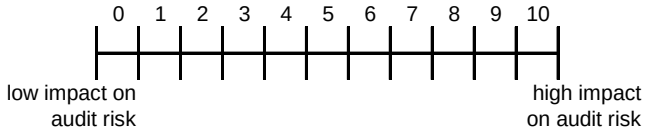
“Recently we have changed the company’s strategy from the construction of regular buildings to luxury villas.”

Additionally, client management tells you that the following entity-level controls have been implemented:

“The project control has been tightened by project control reports”.

“More specialized personnel has been assigned to projects”.

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?



Task 5.6:

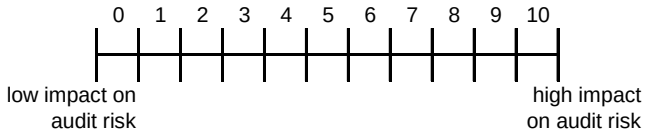
In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you as follows:

“Recently we have changed the company’s strategy from the construction of regular buildings to luxury villas.”

Additionally, client management tells you that the following entity-level control has been implemented:

“More specialized personnel has been assigned to projects”.

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?



Task 5.7:

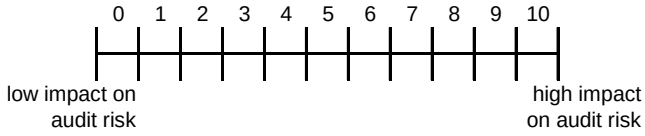
In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you as follows:

“Recently we have changed the company’s strategy from the construction of regular buildings to luxury villas.”

Additionally, client management tells you that the following entity-level control has been implemented:

“The project control has been tightened by project control reports”.

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?



Task 5.8:

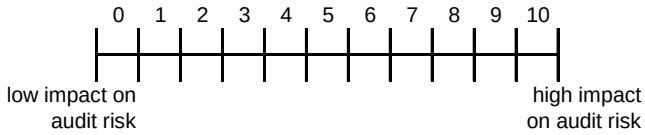
In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you as follows:

“The financial position of the construction company dramatically deteriorated”.

Additionally, client management tells you that the following entity-level control has been implemented:

“More specialized personnel has been assigned to projects”.

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?



Task 5.9:

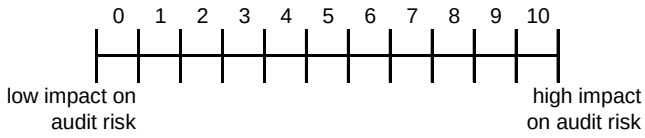
In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you as follows:

“The financial position of the construction company dramatically deteriorated”.

Additionally, client management tells you that the following entity-level control has been implemented:

“The project control has been tightened by project control reports”.

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?



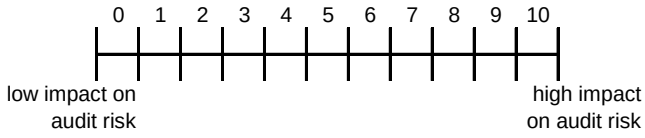
Task 5.10:

In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you that the following entity-level controls have been implemented:

“The project control has been tightened by project control reports”.

“More specialized personnel has been assigned to projects”.

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?



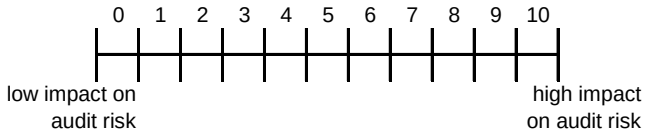
Task 5.11:

In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you as follows:

“The financial position of our construction company dramatically deteriorated”.

“Recently we have changed the company’s strategy from the construction of regular buildings to luxury villas.”

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?

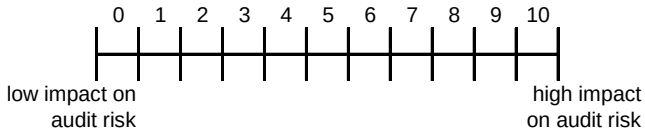


Task 5.12:

In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you as follows:

"Recently we have changed the company's strategy from the construction of regular buildings to luxury villas."

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?

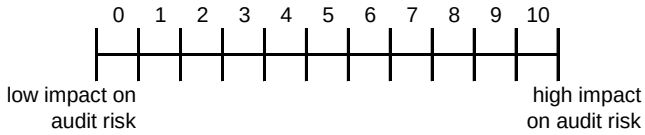


Task 5.13:

In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you that the following entity-level control has been implemented:

"The project control has been tightened by project control reports".

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?

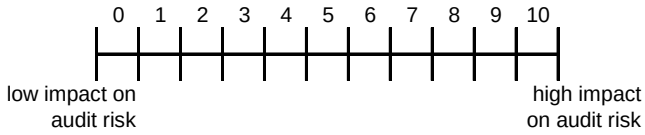


Task 5.14:

In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you as follows:

“The financial position of the construction company dramatically deteriorated”.

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?

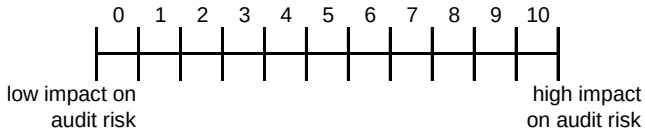


Task 5.15:

In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you that the following entity-level control has been implemented:

“More specialized personnel has been assigned to projects”.

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?



Task 5.16:

In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you as follows:

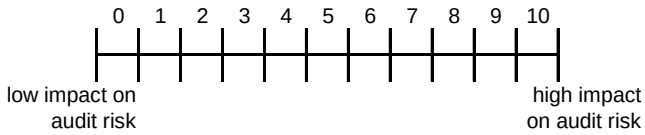
“Recently we have changed the company’s strategy from the construction of regular buildings to luxury villas.”

Additionally, client management tells you that the following entity-level controls have been implemented:

“The project control has been tightened by project control reports”.

“More specialized personnel has been assigned to projects”.

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?



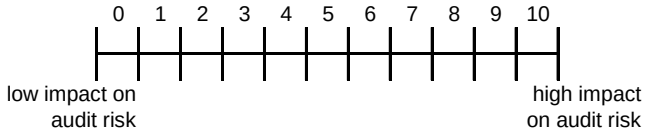
Task 5.17:

In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you as follows:

“The financial position of the construction company dramatically deteriorated”.

“Recently we have changed the company’s strategy from the construction of regular buildings to luxury villas.”

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?



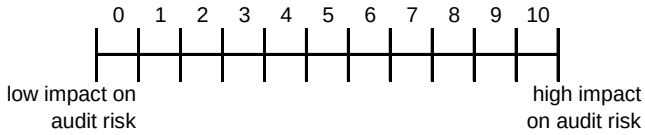
Task 5.18:

In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you that the following entity-level controls have been implemented:

“The project control has been tightened by project control reports”.

“More specialized personnel has been assigned to projects”.

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?



Task 5.19:

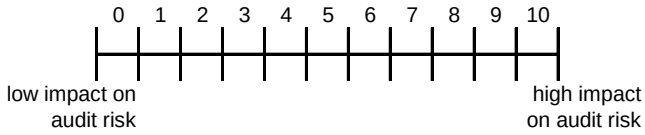
In the pre-audit meeting (April 2002) preceding the 2002 financial statement audit, client management informs you as follows:

“Recently we have changed the company’s strategy from the construction of regular buildings to luxury villas.”

Additionally, client management tells you that the following entity-level control has been implemented:

“More specialized personnel has been assigned to projects”.

What is according to your perception the impact of this new information on the level of audit risk of the financial statement account Work in Progress?



Many thanks for completing this questionnaire. Please, do not forget to complete the debriefing questionnaire!

End of questionnaire -0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-

Debriefing questionnaire

General experience in the Auditing field

1. Hoe many years do you have experience in the Auditing field? _____ years

Segment-specific experience

2. Did you ever receive training courses related to the construction industry?

   Yes_____ No_____

If yes:

How many annual hours on average? _____ annual hours

Describe in concise wordings which training courses you have received related to the construction industry.

_____
_____

3. How many days do you spend on average on an annual basis to knowledge acquisition related to the construction industry? _____ days on an annual basis.

4. How many hours (estimation) did you spend over the past three years on audit engagements in the construction industry? _____ hours over the past three years (cumulative).

5. Have you ever been employed outside the auditing field in a construction company?

   Yes____ No_____

If yes:

Describe functional level:_____

And, how many years of experience do you have, outside the auditing field, in the construction industry? _____ years

Personal and task-characteristics

6. How often (estimation) did you perform in 2002 the following tasks. Please, provide additionally the cumulative number of hours you have spent on these tasks (estimation):

   - The identification of business risks: _____ number of times

     _____ cumulative number of hours

   - Assessing the impact of business risks on audit risk:

     _____ number of times

     _____ cumulative number of hours

   - The identification of entity-level controls:

     _____ number of times

     _____ cumulative number of hours

   - Assessing the impact of entity-level controls on audit risk:

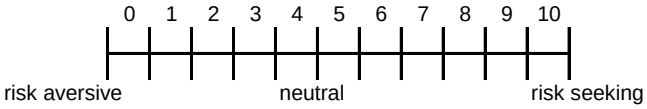
     _____ number of times

     _____ cumulative number of hours

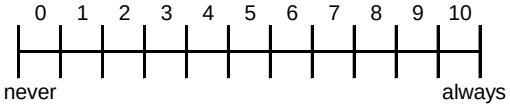
7. If you audited last year the financial statements of one or more company's in the construction industry, please describe which business risk most obviously was present?

_____

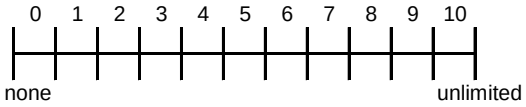
8. How would you characterize your risk-attitude when conducting audit risk assessment in a certain financial statement audit:



9. How often doe you receive feedback from your supervisor having conducting the audit risk assessment task?



10. How much autonomy do you perceive when conducting the audit risk assessment task?



11. If you would have liked to use a decision aid in completing this questionnaire, which decision aid would you have used?

_____

12. Assume: you are confronted with the following choice. You receive:

    (1) with 100% certainty an amount of € 10,000 or:
    (2) eventually an amount of € 25,000.

Which percentage of certainty (0 – 100) would you need to choose the second option (an amount of € 25,000)?

____ %

Other

13. In Task 5 of the questionnaire you have been provided with varying combinations four or less information-elements. Which weights would you attribute toe ach of these information-elements when assessing the impact of these information-elements on audit risk for the financial statement account Work in Progress? By distributing 100 (weight) points across these information-elements you can attribute the weights. A higher number of points implies that you attribute a higher weight to the information-element.

Information-elements	**Weight assessment** (when assessing the impact on audit risk for the financial statement account Work in Progress
"The financial position of the construction company recently dramatically deteriorated".	
"Recently we have changed our company's strategy and moved from the construction of regular buildings to building luxury villas".	
"Project-control has been tightened by project control reports".	
"More specialized personnel has been assigned to projects".	
	Sum = 100

14. Should you have any questions or remarks relating to this questionnaire, please enter them below.

_____
_____
_____
_____

15. Do you appreciate to receive a copy of publications resulting from this empirical study?

Yes____ No____

End of questionnaire -0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-

Appendix C: List of risk factors

1	Absence of analysis of hours worked
2	Risk of insufficient innovation
3	Administrative organization, including the internal controls, is not sufficient
4	Finance administration is not pro-actively used
5	Organization structure[45]
6	Risk of an informal organization
7	Risk of competitive position (amongst others, the risk of new entrants)
8	Risk with respect to internal communication
9	Risk regarding contacts with suppliers and sub-contractors
10	Purchase contracts were negotiated afterwards (risk of unknown purchase costs when calculating tenders)
11	Risk of shifts of recorded hours, materials etc. between projects
12	Fraud risks
13	Risk of liability (result of quality of the project)/sensitiveness to claims
14	Quality of personnel
15	Recoverability of general costs ('AK')
16	Risk due to low level of information technology
17	Exit risk key personnel
18	Business operations are strongly dependent of the director
19	Risk of insufficient project-control
20	Risk of changing demand for the projects/services of the company
21	Debtor risks
22	Risk of competition on price
23	Risk of lately invoicing, resulting in high levels of Work in Progress
24	Risk of not charging principals for costs increases (fixed fee contracts)
25	Quality of projects is not adequate
26	Management information deviates from finance administration; Managing is based upon the wrong numbers
27	Financial position of the company
28	Risk of absence of monitoring the completeness of the variation status list

[45] Respondents were asked to identify and describe in short wordings the nature of the client business risks. In some cases, this wording could be interpreted in multiple ways.

29	Risk due to absence of formalized corporate strategy
30	Compliance risks (environmental regulations, working conditions etc.)
31	Risk of limited number of principals
32	Risk of calculation errors
33	Risk of project losses
34	Risk of insufficient Work at hand, limited project-portfolio
35	Risk of discussions regarding variation status list due to insufficient formalization of project variations

Appendix D: List of entity-level controls

1	Management information related to Work in Progress (= project control)
2	Comparison of ex ante (budgeted) and ex post (realized) project-results
3	Budgeting procedures (including monitoring General Costs, 'AK')
4	Segregation of duties
5	Compliance-procedures rules and regulations
6	Organizational structure, including the assigned tasks, responsibilities and authorizations
7	Properly functioning of project-(sub-)administration
8	Formalization of confirmations relating to deviations of original contracts (variation status list)
9	Supervision of the Board
10	Frequently held meetings of the Board and the principal(s)
11	Ex ante project-calculations (see also no.2)
12	Flat organization, including frequently held internal meetings
13	Procedure in place of negotiating purchase contracts based upon detailed project-budgets
14	Timesheet administration which reconciles with the finance administration
15	Procedures in place aiming timely invoicing of installments to the principal
16	Monitoring procedures with regard to the financial position and capital funding
17	Code of conduct
18	Procedures in place in order to make flexible use of company personnel
19	Adequate information technology
20	Reconciliation procedures of project-calculations to project-specifications
21	Control-awareness of/in the control environment
22	Formalization of strategy process including putting strategy into operation
23	Authorization procedures regarding timesheets
24	Procedures related to education and selection of company personnel
25	Risk analysis
26	Monitoring procedures regarding debtor position
27	Registration procedures related to contracts

Nederlandse samenvatting

Doel van het onderzoek

Het doel van dit onderzoek is het verbeteren van het inzicht in de kwaliteit van oordeelsvorming van accountants bij controletaken die worden uitgevoerd als onderdeel van een op bedrijfsrisico's gebaseerde controleaanpak. De uit de doelstelling van het onderzoek afgeleide onderzoeksvragen zijn gericht op mogelijke determinanten van de kwaliteit van oordeelsvorming. De in dit onderzoek betrokken determinanten zijn:

- Algemene ervaring;
- Taakspecifieke ervaring;
- Industriespecifieke ervaring;
- Feedback;
- Algemene risicohouding.

In hoofdstuk 2 wordt beschreven hoe de onderzoeksvragen zich verhouden tot eerdere empirische onderzoeken. Voor wat betreft de variabele 'ervaring' hebben de eerste onderzoeken zich gericht op de mogelijke bijdrage van algemene ervaring aan de kwaliteit van oordeelsvorming. Hieruit komt naar voren dat er zowel een positieve als een negatieve impact van algemene ervaring op de kwaliteit van oordeelsvorming wordt gerapporteerd. Als algemene verklaring voor deze gemengde onderzoeksresultaten wordt gesuggereerd dat de variabele 'algemene ervaring' onvoldoende specifiek is en daarmee niet eenduidig interpreteerbaar is. Relatief recentere onderzoeken hebben sindsdien onderzocht in hoeverre de complexiteit van controletaken een betere maatstaf is als determinant van de kwaliteit van oordeelsvorming. Taakcomplexiteit werd in die onderzoeken gemeten door de variabele 'taakspecifieke ervaring'. Deze onderzoeken rapporteerden overwegend een positieve invloed van taakspecifieke ervaring op de kwaliteit van oordeelsvorming. In het vorige decennium hebben de grote accountantskantoren zich steeds meer georganiseerd rond industriespecifieke *service-lines* gebaseerd op de veronderstelling dat industriespecifieke kennis onontbeerlijk is voor een goede kwaliteit van accountantscontrole. Voor in het bijzonder de sterk gereguleerde industrieën (bijvoorbeeld de bancaire sector) werden de eerste onderzoeken gerapporteerd vanaf eind jaren negentig. Het beeld dat hieruit naar voren komt is dat industriespecifieke ervaring positief bijdraagt aan de kwaliteit van oordeelsvorming. Tot op heden is er nog geen onderzoek verricht naar de gezamenlijke

effecten van de drie genoemde categorieën van ervaring. Deze empirische studie voorziet in deze leemte.
In aanvulling op de drie soorten van ervaring wordt in deze studie tevens onderzoek gedaan naar de invloed van ‘feedback’ en ‘algemene risicohouding’ op de kwaliteit van oordeelsvorming. De variabele ‘feedback’ is een belangrijke bouwsteen van het stelsel van kwaliteitsbeheersingsmaatregelen van een accountantskantoor. Terugkoppeling van een leidinggevende over de kwaliteit van uitgevoerde werkzaamheden aan een ondergeschikte, draagt naar verwachting bij aan de leercurve van de ondergeschikte en daarmee aan de kwaliteit van oordeelsvorming. De variabele ‘algemene risicohouding’ is een algemene persoonseigenschap die naar verwachting ook invloed uitoefent op oordeelsvorming met betrekking tot risicoanalyses die in de accountantscontrole worden uitgevoerd. Aangezien voor deze variabele geen eerdere empirische studies zijn verricht is het niet mogelijk om op voorhand de richting van de invloed van deze variabele op de kwaliteit van oordeelsvorming te hypothetiseren. Het betrekken van deze variabele in het empirische onderzoek is daarom exploratief van aard.

Onderzoeksopzet

De opzet van het onderzoek wordt beschreven in hoofdstuk 3 van dit proefschrift. Het doel van dit onderzoek is het verbeteren van het inzicht in de mate waarin ervaring- en feedback-, en risicohouding gerelateerde variabelen invloed hebben op de kwaliteit van het oordeel van de accountant. Voor wat betreft de ervaring-gerelateerde variabelen werd daarbij onderscheid gemaakt naar drie soorten van ervaring die de accountant opdoet gedurende zijn carriere:

- Algemene ervaring, gemeten in termen van het aantal jaren dat de accountant werkzaam is in de accountancy;
- Taakspecifieke ervaring, gemeten in termen van het aantal uur dat de accountant in de afgelopen periode heeft besteed aan specifieke taken van het controleprogramma;
- Industriespecifieke ervaring, gemeten in termen van het aantal uur dat de accountant in de afgelopen periode van drie jaar heeft besteed aan de controle van jaarrekeningen van ondernemingen die activiteiten ontplooien in de bouwsector.

Twee specifieke taken die een belangrijke rol spelen in de relatief nieuwe – op bedrijfsrisico’s gebaseerde – controlemethodologie zijn nader onderzocht. De op

bedrijfsrisico's gebaseerde controlemethodologie werd medio jaren negentig van het vorige decennium ingevoerd. Hierbij wordt voortgeborduurd op de meer traditionele controlemethodologie die gebaseerd is op accountantscontrolerisico's. Met name vanwege de noviteit van de herziene controlemethodologie worden de geformuleerde onderzoeksvragen naar de invloeden van ervaring op de kwaliteit van het accountantsoordeel actueel. Ook vanuit maatschappelijk perspectief bezien, is de aandacht voor de kwaliteit van het accountantsoordeel toegenomen vanwege omvangrijke 'boekhoudschandalen' die hebben plaatsgevonden.

In het onderzoek zijn de volgende twee specifieke taken begrepen:

- De identificatie van bedrijfsrisico's en organisatiebrede beheersingsmaatregelen, bezien vanuit de omgeving van een specifieke controlecliënt;
- De inschatting van de impact van geïdentificeerde bedrijfsrisico's en organisatiebrede beheersingsmaatregelen op het inherente en interne beheersingsrisico gerelateerd aan een specifieke jaarrekeningpost.

Aan het onderzoek hebben 85 accountants van het niveau '(senior) manager' deelgenomen, die allen werkzaam waren bij de vier grote accountantskantoren in Nederland: Deloitte, KPMG, Ernst & Young en PriceWaterhouseCoopers. De keuze voor het functieniveau manager is gebaseerd op de veronderstelling dat accountants met dit functieniveau in de praktijk het meest betrokken zijn bij de uitvoering van de twee gekozen specifieke controletaken. In verband met één van de onderzoeksvragen, te weten de vraag naar de invloed van industriespecifieke ervaring op de kwaliteit van oordeelsvorming, werd de doelgroep onderscheiden in een groep accountants die vooral ervaring hebben in een specifieke industrie (in dit onderzoek de bouwsector) en een groep accountants die dergelijke ervaring niet of nauwelijks hebben. Aan representanten van de vier accountantskantoren werd verzocht binnen hun firma voor beide groepen accountants een representatief aantal medewerkers te selecteren die konden participeren in het onderzoek.

Aan de participanten aan dit onderzoek is een fictieve casus van een bouwbedrijf voorgelegd. Deze casus werd eerst aan een pilot-test onderworpen om het realiteitsgehalte ervan te toetsen. Het praktijkonderzoek was ingedeeld naar de twee taken die geselecteerd waren voor dit onderzoek. Het eerste deel van de vragenlijst was gericht op de identificatie van bedrijfsrisico's en organisatiebrede beheersingsmaatregelen. In dit eerste deel werden de deelnemers in de eerste plaats verzocht om de vijf belangrijkste bedrijfsrisico's te identificeren op basis van de casus.

Aansluitend kregen de deelnemers de opdracht om de vijf belangrijkste organisatiebrede beheersingsmaatregelen te identificeren. Het tweede deel van de vragenlijst was gericht op het inschatten van de invloed van een tweetal bedrijfsrisico's en een tweetal organisatiebrede beheersingsmaatregelen op het inherente- en interne beheersingsrisico, gezamenlijk aangeduid als 'accountantscontrolerisico'. In dit deel van de vragenlijst waren in totaal 15 casusvarianten opgenomen, die elk een mogelijke combinatie vormden van de twee bedrijfsrisico's en de twee organisatiebrede beheersingsmaatregelen. Alle deelnemers dienden de 15 varianten te beoordelen. Tenslotte was aan de vragenlijst een 'debriefing' vragenlijst gehecht waarin de participanten gevraagd is om specifieke persoonskenmerken te vermelden. Deze persoonskenmerken waren voornamelijk gericht op de onafhankelijke variabelen (onder andere de mate van ervaring en het niveau van gepercipieerde feedback die zij in de achterliggende periode ontvingen na het uitvoeren van specifieke controletaken).

Een belangrijk element van de onderzoeksopzet betreft de wijze waarop de kwaliteit van oordeelsvorming wordt gemeten. Voor het eerste deel van het onderzoek, gericht op de identificatietaken, werd voorafgaand aan het praktijkonderzoek een expert panel bijeenkomst georganiseerd. De uitkomsten van deze expert panel bijeenkomst resulteerden in een benchmark waaraan de oordeelsvorming van de participanten kan worden gerelateerd. Een expert panel is alleen dan zinvol als duidelijk is dat de panelleden individueel en gezamenlijk superieure oordeelsvorming hebben vergeleken met de doelgroep van dit onderzoek. Daarom werden aan de samenstelling van het expert panel hoge eisen gesteld. Het expert panel bestond uit vier partners van de grote vier accountantskantoren in Nederland die verantwoordelijk zijn – nationaal dan wel internationaal – voor het bouwsegment binnen het accountantskantoor. Dit impliceert dat zij zowel een substantiële bijdrage leveren aan de kennisorganisatie van dat segment binnen het accountantskantoor, alsook dat zij inzicht hebben in en overzicht hebben van datgene wat er zich binnen de bouwsector afspeelt, en dat zij tevens betrokken zijn bij de controle van belangrijke cliënten in de bouwsector. Voor wat betreft het tweede deel van het onderzoek, gericht op de wegingtaak, werd voor het meten van de kwaliteit van oordeelsvorming voornamelijk gebruik gemaakt van de variabele 'consensus', waarbij de inschattingen van elke individuele accountant werden vergeleken met elke andere individuele accountant.

Resultaten

Identificatietaken

In hoofdstuk 4 van dit proefschrift worden de onderzoeksresultaten met betrekking tot de identificatie van bedrijfsrisico's en organisatiebrede beheersingsmaatregelen beschreven. De eerste onderzoekshypothese verwacht dat de variabele 'algemene ervaring in de accountancy' de kwaliteit van het accountantsoordeel verbetert. Deze hypothese wordt alleen bevestigd met betrekking tot de identificatie van organisatiebrede beheersingsmaatregelen.

Eerdere onderzoeken, die met name gericht waren op minder complexe taken (zoals het inschatten van inherente en interne beheersingsrisico), vonden gemengde resultaten. Gegeven de complexiteit van de identificatietaak is het met name verrassend dat de factor algemene ervaring niet positief bijdraagt aan de kwaliteit van het accountantsoordeel bij het identificeren van bedrijfsrisico's. Het zou kunnen zijn dat dit verklaard wordt doordat elke individuele accountant zich gedurende zijn/haar loopbaan op een unieke manier ontwikkelt. Hierdoor is algemene ervaring niet altijd een goede voorspeller voor de kwaliteit van het accountantsoordeel.

De tweede onderzoekshypothese verwacht een positieve invloed van de variabele industriespecifieke ervaring op de kwaliteit van het accountantsoordeel. De onderzoeksresultaten steunen deze hypothese. Echter, uit nadere analyse van de taak 'identificatie van bedrijfsrisico's' blijkt dat het verband tussen industriespecifieke ervaring en de kwaliteit van het accountantsoordeel niet lineair is. Daarom werd geen 'gewone' lineaire regressie uitgevoerd, maar een niet-lineaire regressie. Het niet-lineaire regressiemodel voorspelt dat de kwaliteit van het accountantsoordeel vanaf een bepaald niveau van industriespecifieke ervaring afneemt. Dit zou mogelijk verklaard kunnen worden door het optreden van blinde vlekken wanneer een accountant verregaand gespecialiseerd is in een bepaalde industrie en het oordeel met name baseert op ervaringen opgedaan bij een beperkt aantal cliënten in zijn/haar cliëntenportefeuille. Hierdoor wegen specifieke ervaringen zwaarder in het oordeel dan algemene bedrijfsrisico's die uit industriebrede onderzoeken naar voren komen.

Voor de derde hypothese, waarin een positieve invloed van taakspecifieke ervaring op de kwaliteit van het accountantsoordeel wordt verwacht, werd geen bevestiging gevonden. Eveneens werd geen bevestiging gevonden voor de vierde hypothese, waarin een positieve invloed van de variabele 'feedback' (het niveau van feedback dat accountants percipiëren als zij risicoanalyses uitvoeren in de praktijk) op de kwaliteit van het accountantsoordeel werd verwacht. Voor wat betreft de invloed van gepercipieerde feedback op de kwaliteit van het accountantsoordeel met betrekking tot wegingtaken worden tegenovergestelde uitkomsten gerapporteerd (zie de navolgende sectie).

Daarom dienen interpretaties van deze uitkomsten voorzichtig te gebeuren. Het is denkbaar dat de uitkomsten van het onderzoek anders zouden zijn als de variabele 'feedback' op een andere wijze zou zijn gemeten.

Samenvattend suggereren de onderzoeksresultaten dat alleen de factor 'industriespecifieke ervaring' helpt om de kwaliteit van het accountantsoordeel te verbeteren voor wat betreft de in het onderzoek betrokken controletaken. Dit positieve industrie-effect geldt echter tot een bepaald niveau van industriespecifieke ervaring. Een verdere toename van industriespecifieke ervaring vanaf dit niveau leidt tot een afname van de kwaliteit van het accountantsoordeel. Uit deze onderzoeksresultaten volgt de suggestie voor het management van accountantskantoren om de uitvoering van identificatietaken zorgvuldig toe te wijzen aan leden van het controleteam die over voldoende industriespecifieke ervaring beschikken, en die tevens ook voldoende ervaren zijn in andere industrieën (inclusief de algemene controlepraktijk).

Wegingtaak

Hoofdstuk 5 van dit proefschrift beschrijft de onderzoeksresultaten met betrekking tot de inschatting van de impact van twee bedrijfsrisico's en twee organisatiebrede beheersingsmaatregelen op het inherente en interne beheersingsrisico. Voorafgaand aan het analyseren van de mate van consensus tussen accountants is eerst gekeken naar de stabiliteit van de oordelen van de accountant. Dit is gedaan door het per individuele accountant vergelijken van de inschattingen op vier van de vijftien casevarianten met vier herhaalde casevarianten. Uit de onderzoeksresultaten blijkt een stabiliteitsniveau van .93. Dit gevonden stabiliteitsniveau kan als zeer hoog worden aangeduid.

Voor de groep van accountants als geheel wordt in het onderhavige onderzoek een onderlinge consensus van .72 gerapporteerd. Vergeleken met eerdere consensus-gerelateerde onderzoeken, welke gericht waren op inschattingen ten aanzien van het traditionele controlerisicomodel, is deze consensusscore hoog te noemen. De in dit onderzoek betrokken taak is immers aan te duiden als een relatief nieuwe controlemethodologie en verwacht zou daarom kunnen worden dat ten opzichte van eerdere controlemethodologieën een lagere consensusscore gerapporteerd zou worden. Per onafhankelijke variabele worden de volgende resultaten gerapporteerd:

- De groep met het hoogste gemiddelde niveau van algemene ervaring scoort een significant lager consensusniveau vergeleken met de groep met het laagste gemiddelde niveau van algemene ervaring (0,70 versus 0,75).

- De groep met het hoogste gemiddelde niveau van industriespecifieke ervaring scoort het laagste op consensus (0,59). De groep die geen industrieervaring heeft scoort relatief erg hoog (0,74). Ook wordt een relatief hoge consensusscore gerapporteerd voor de groep accountants die tussen beide ervaringsextremen (laag/hoog) inligt (0,78).
- De groep met het hoogste gemiddelde niveau van taakspecifieke ervaring scoort het hoogste op consensus (0,78) vergeleken met de groepen die een lager ervaringsniveau hebben.
- De groep met het hoogste gemiddelde niveau van gepercipieerde feedback scoort relatief hoog op consensus (0,72) vergeleken met de groep met het laagste niveau van gepercipieerde feedback (0,66).
- De groep meest risicoaverse accountants scoorde het laagste op consensus (0,64).

Tenslotte is gekeken naar het niveau van zelfinzicht dat de deelnemende accountants hadden bij het uitvoeren van wegingtaak. Gegeven de relatieve noviteit van de taak is het niveau van zelfinzicht van de gehele groep van accountants (0,69) tamelijk goed te noemen. Geen van de onafhankelijke variabelen had een significante invloed op het niveau van zelfinzicht.

Deze uitkomsten zijn in overeenstemming met de geformuleerde hypothesen voor wat betreft de variabelen algemene ervaring, taakspecifieke ervaring en het gepercipieerde niveau van feedback en in tegenspraak met de hypothese voor wat betreft de variabele industriespecifieke ervaring. Voor wat betreft de variabele risicohouding was niet vooraf een verwachte richting bepaald van het verband tussen risicohouding en kwaliteit van het accountantsoordeel.

Ook voor de wegingtaak geldt dat toewijzing van specifieke controletaken aan leden van het controleteam op zorgvuldige wijze dient plaats te vinden. Waar echter bij de identificatietaken vooral de factor industriespecifieke ervaring een belangrijke overweging is, zijn voor de wegingtaak andere factoren van invloed op de kwaliteit van het accountantsoordeel. De kwaliteit van het accountantsoordeel is erbij gebaat wanneer de wegingtaak wordt uitgevoerd door accountants die veel ervaring hebben met deze taak. Naast taakspecifieke ervaring speelt ook de mate waarin een leidinggevende feedback geeft aan degene die de wegingtaak heeft uitgevoerd, een belangrijke rol. Het belang van het tijdig geven van feedback is groot aangezien het

verder uit te voeren controleprogramma afhankelijk is van de uitkomsten van de risicoanalyse.

Beperkingen van het onderzoek

Om de onderzoeksresultaten in het juiste perspectief te plaatsen, worden hierna de beperkingen van deze empirische studie beschreven.

Identificatietaken
In de eerste plaats zijn er beperkingen ten aanzien van de meetbaarheid van het begrip 'kwaliteit van oordeelsvorming'. De kwaliteit van oordeelsvorming is in deze studie voor de identificatietaken (namelijk de identificatie van bedrijfsrisico's en de identificatie van organisatiebrede beheersingsmaatregelen) gemeten door de variabele 'nauwkeurigheid'. De mate van nauwkeurigheid werd gemeten door de inschattingen van accountants te vergelijken met de inschattingen van een expert panel. Andere empirische studies hebben in het verleden de variabele 'nauwkeurigheid' onder andere gemeten door het oordeel van individuele accountants te vergelijken met het optimale oordeel van collega accountants uit dezelfde doelgroep. Het meten van een optimum is toepasbaar in onderzoeken waarbij nauwkeurigheid wordt bepaald door het *aantal* geïdentificeerde factoren. In de onderhavige studie was deze laatste metingswijze niet goed mogelijk aangezien er in de onderzoeksopzet voor was gekozen om de participanten per identificatietaak maximaal vijf bedrijfsrisico's en vijf organisatiebrede beheersingsmaatregelen te laten identificeren. De onderzoeksopzet limiteerde derhalve het optimum. De kwaliteit van het accountantsoordeel wordt echter niet bepaald door het *aantal* risico's of beheersingsmaatregelen dat een participant identificeert, maar door de *juistheid* van de geïdentificeerde risico's en beheersingsmaatregelen. De kwaliteit van het accountantsoordeel is meer gerelateerd aan de aard dan aan het aantal geïdentificeerde factoren. Een beperking die voortvloeit uit de gekozen onderzoeksopzet is derhalve dat de benchmark waarmee de inschattingen van individuele accountants worden vergeleken, een groepsmaatstaf is (namelijk een inschatting van een groep van experts) en niet een individuele maatstaf. Vanuit de literatuur (bijvoorbeeld, Bedard en Maroney, 2000) is bekend dat de kwaliteit van het oordeel van een groep personen bij bepaalde taken hoger is dan de kwaliteit van het oordelen van individuele personen. Het is daardoor theoretisch denkbaar dat de factor 'groepsoordeel' mede invloed heeft op de uitkomsten van de in deze studie gerapporteerde uitkomsten.

De tweede beperking van het huidige onderzoek is ook gerelateerd aan de identificatietaken. De deelnemers aan het onderzoek kregen de opdracht om de belangrijkste vijf bedrijfsrisico's en beheersingsmaatregelen te identificeren. Hun oordelen werden vergeleken met de oordelen van het expert panel. Tijdens de expert panel bijeenkomst kregen de experts deze zelfde opdracht echter *individueel* voorgelegd. Uit deze vraagstelling resulteerde een totaallijst van risico's en beheersingsmaatregelen die groter is dan het toegestane maximum van vijf dat de onderzoeksdeelnemers. Deze totaallijst van 'goede antwoorden' behoorden alle tot de vijf belangrijkste. Het is dus modelmatig denkbaar dat twee individuele accountants tot een verschillende top vijf van bedrijfsrisico's en organisatiebrede beheersingsmaatregelen komen, maar toch eenzelfde mate van nauwkeurigheid scoren. Achteraf bezien heeft deze onderzoeksopzet geleid tot een hogere mate van complexiteit en daardoor moeilijker te interpreteren onderzoeksresultaten in vergelijking tot een andere denkbare onderzoeksopzet. Het is bijvoorbeeld mogelijk om de experts op basis van de totaallijst aanvullend een ranking van 1 tot 5 aan deze risico's en beheersingsmaatregelen toe te laten kennen. Op basis van deze ranking zou de totaallijst van het expert panel teruggebracht kunnen worden tot de vijf risico's en vijf beheersingsmaatregelen met de hoogste ranking.

Wegingtaak

Een derde beperking van het huidige onderzoek is het aantal bedrijfsrisico's en organisatiebrede beheersingsmaatregelen dat de accountant overweegt bij het inschatten van de impact van deze risico's en beheersingsmaatregelen op het controlerisico. Dit is de zogenaamde wegingtaak ter onderscheiding van de hiervoor beschreven identificatietaak. In het onderhavige onderzoek werden aan de individuele accountants in totaal twee bedrijfsrisico's en twee organisatiebrede beheersingsmaatregelen voorgelegd, waarvan ze in wisselende samenstelling de invloed op het controlerisico moesten inschatten. Dit is een zogenaamd 2^4 (full) factor design. Uit de resultaten van psychologische onderzoeken volgt dat een mens, en dus ook een accountant, beperkt is in het aantal factoren dat tegelijkertijd in een besluit of in een oordeel kan worden meegewogen. Dit was dan ook reden om slechts 4 factoren in het design te betrekken. Bij dergelijke onderzoeken bestaat het risico dat de oordeelsvorming van de participant mede wordt beïnvloed door factoren als vermoeidheid of verveling vanwege het relatief grote aantal case varianten dat aan de participant wordt voorgelegd. Om de mogelijke effecten van vermoeidheid of verveling te onderzoeken is gebruik gemaakt van drie vragenlijsten waarvan de volgorde waarin de case varianten aan de participant werden voorgelegd, verschilde. De

onderzoeksresultaten indiceren dat er in beperkte mate (de gemiddelde consensus per groep varieerde tussen de 0,70 en de 0,73) sprake is van volgorde effecten. Een volgorde effect suggereert dat participanten mogelijk hebben ervaren dat de vragenlijst te lang was. Geen van de deelnemers heeft een dergelijk argument overigens gemeld in de terugkoppelingsvragenlijst. Daarom kan worden verondersteld dat positieve en negatieve afwijkingen ten gevolge van verschillen in volgorde elkaar hebben gecompenseerd. Het argument hiervoor is dat twee van de drie volgorden exact een tegenovergestelde volgorde bevatten. Evenwel verdient het aanbeveling om in toekomstig onderzoek de vragenlijst niet te lang te maken. Ook dient het aantal risico's en beheersingsmaatregelen dat in een onderzoeksdesign wordt betrokken zorgvuldig te worden overwogen. In deze studie is uitgegaan van een "full factor" design. Wanneer het aantal factoren dat in het onderzoek wordt betrokken, toeneemt, is ook een "fractional factor" design denkbaar. In een dergelijke onderzoeksopzet worden niet alle denkbare combinaties van factoren aan onderzoeksparticipanten voorgelegd, maar een deel (bijvoorbeeld de helft) ervan.

Suggesties voor toekomstig onderzoek

Onderzoeksopzet

De in het onderhavige onderzoek gehanteerde onderzoeksopzet leidde zowel tot een efficiënte wijze van dataverzameling als tot een effectieve manier van bestuderen van de gestelde onderzoeksvragen. Het gebruik maken van een expert panel heeft positief bijgedragen aan bestaand onderzoek naar de potentiële effecten van industrieervaring op de kwaliteit van oordeelsvorming. Het verdient aanbeveling om in toekomstig onderzoek zorgvuldig te overwegen in hoeverre de selectie van panelleden de definitie van 'expert' op een bepaald terrein benadert. Experts dienen personen te zijn waarvan duidelijk is dat zij de hoogste denkbare kwaliteit van oordeelsvorming bezitten. De mate van expertise dient daarbij gerelateerd te worden aan de controletaak die in het onderzoek wordt betrokken. Een momenteel nog onvoldoende ontgonnen onderzoeksterrein is in dit kader de categorisering van controletaken naar het bijbehorende functionele niveau van de accountant. Voor traditionele controlemethodologieën is een dergelijke categorisering reeds verricht (zie bijvoorbeeld de studie van Abdolmohammadi, 1999). Voor de relatief nieuwe op bedrijfsrisico's gebaseerde controlemethodologie is deze echter nog niet voorhanden. Een dergelijke categorisering zal naar verwachting bijdragen tot: (1) een zorgvuldige selectie van de te onderzoeken doelgroep van accountants (welk(e) functieniveau(s) worden in het onderzoek betrokken?), en (2) de samenstelling van een expert panel, hetgeen specifiek

van belang is wanneer de effecten van taakspecifieke ervaring op de kwaliteit van oordeelsvorming worden onderzocht.

Onderzoeksresultaten – implicaties voor het "expertise paradigma"

Deze studie is de eerste empirische studie die tegelijkertijd drie categorieën ervaring heeft betrokken in het onderzoek. Door de integratie van deze drie categorieën van het relatief nieuwe onderzoeksterrein (i.c., de op bedrijfsrisico's gebaseerde controleaanpak) is nieuwe kennis ontstaan op basis van dit onderzoek. Een voorbeeld hiervan betreft het onderzoeksresultaat dat alleen industriespecifieke ervaring in een bepaalde mate significant bijdraagt aan de kwaliteit van oordeelsvorming. Algemene en taakspecifieke ervaring blijken in het regressiemodel niet significant bij te dragen aan de kwaliteit van oordeelsvorming. In toekomstige empirische onderzoeken kan hierop worden voortgeborduurd. Een voorbeeld hiervan is het onderzoek naar andere controletaken van de op de bedrijfsrisico's gebaseerde controleaanpak, zoals het inschatten van de implicaties van geïdentificeerde bedrijfsrisico's voor het resterende controleprogramma waaronder de uit te voeren gegevensgerichte testprocedures. In aanvulling hierop zou toekomstig onderzoek zich tevens kunnen richten op de voor de uitvoering van specifieke taken benodigde kennis en vaardigheden. In dit onderzoek is bijvoorbeeld de invloed van industriespecifieke kennis onderzocht als maatstaf voor expertise voor bepaalde controletaken. Uit eerder onderzoek (Lemon e.a., 2000) blijkt dat het segmenteren van accountantskantoren naar onderscheiden industrieën niet alleen het oogmerk van verbetering van de kwaliteit van de controle heeft, maar dat daarmee ook andere doelen zijn nagestreefd. Onder deze doelstellingen vallen bijvoorbeeld ook: (1) marketing gerelateerde argumenten (door segmentatie wordt industriespecifieke kennis optimaal ingezet ten bate van het leveren van toegevoegde waarde aan controlecliënten, welke bijvoorbeeld zichtbaar wordt in interim management letters en accountantsverslagen), en (2) verlaging van de in rekening gebrachte controlekosten door efficiency-voordelen (bijvoorbeeld bundeling van kennis bij een selecte groep van mensen kan leiden tot verbetering van de kennisorganisatie in het accountantskantoor). Het verdere onderzoek naar de inhoud en aard van industriespecifieke kennis en ervaring kan dientengevolge bijdragen aan het beleid van accountantskantoren ter zake van segmentatie alsook aan het toewijzen van individuele accountants aan specifieke controlecliënten of aan specifieke taken binnen het controleteam. Een specifieke controletaak die nader onderzoek verdient, betreft onder andere de bijdrage van industriespecifieke kennis en ervaring aan de kwaliteit van uit te voeren cijferbeoordelingen. Is het zo dat een accountant die meer in een bepaalde industrie gespecialiseerd is, ook beter in staat is om op basis van cijferbeoordeling materiële fouten in de jaarrekening op te sporen? Is deze accountant ook beter in staat

om cijferontwikkelingen te begrijpen op basis van ontwikkelingen die zich in een industrie hebben afgespeeld in de achterliggende periode (vergelijk de studie van Erickson e.a., 2000)?

Dit onderzoek is - voor het beoordelen van de invloed van industrieervaring op de kwaliteit van oordeelsvorming – geconcentreerd op de bouwsector. De effecten die in deze sector naar voren komen, komen niet geheel overeen met onderzoeken die gericht waren op (in termen van overheidstoezicht en regelgeving terzake van externe verslaggeving) zwaarder gereguleerde industrieën zoals de bancaire industrie, de verzekeringsindustrie en gezondheidszorg. Om te komen tot generaliserende uitspraken over de invloeden van industrieervaring verdient het aanbeveling om in toekomstig onderzoek meerdere industrieën tegelijk te betrekken.

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Curriculum Vitae

Niels van Nieuw Amerongen was born in Breukelen on May 8th 1973. After graduating from the “Driestar College” in Gouda in 1991, he studied Economics (finalized in 1995) and Accountancy (finalized in 1998) at the Vrije Universiteit. He started his career at Berk Accountants and Belastingadviseurs (1995-1996) and he continued his practical experience in auditing at Ernst & Young (1996-2006), the last 2.5 years as a senior manager. Starting with a small/medium-sized client portfolio (including clients in the local government and construction industry), his career moved in 2004 towards audit engagements in the national and international insurance practice with a focus on audits of clients converting their accounting principles to International Financial Reporting Standards (IFRS) and implementing Sarbanes-Oxley Act 2002 (SOX). In August 2006, he started his own firm “New Venture, New Advisers b.v.”. In his new role he is involved in an implementation program of Sarbanes-Oxley for a multinational client in the oil and gas industry. Furthermore, he holds a part-time position at Vrije Universiteit, as a teacher and researcher.