Internal auditing and audit committees:

Four essays on issues in research and practice

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List of Abbreviations

ABS ..... Association of Business Schools

AC ..... Audit Committee

ACE ..... Audit Committee Effectiveness

AE ..... Accounting Expert

AICPA ..... American Institute of Certified Public Accountants

AJPT ..... Auditing: A Journal of Practice and Theory

AOS ..... Accounting, Organizations and Society

[A] ..... Archival

BCCI ..... Bank of Credit and Commerce International

BRC ..... Blue Ribbon Committee

Bus. ..... Busyness

CAE ..... Chief Audit Executive

CAR ..... Contemporary Accounting Research

CBOK ..... Common Body of Knowledge

CEO ..... Chief Executive Officer

CFE ..... Certified Fraud Examiner

CFO ..... Chief Financial Officer

CH ..... Switzerland

CIA ..... Certified Internal Auditor

CIIA ..... Chartered Institute of Internal Auditors

Coeff. ..... Coefficient

COSO ..... Committee of Sponsoring Organizations of the Treadway Commission

CPA ..... Certified Public Accountant

diff. ..... difference

Dil. ..... Diligence

Dr. ..... Doctor (title)

DV ..... Dependent Variable

EA ..... External Auditor

ed. ..... edition

EDP ..... Electronic Data Processing

eds. ..... editors

e.g. ..... exempli gratia

et al. ..... et alii

etc. ..... et cetera

EU ..... European Union

Eurostat ..... European Statistical Office

EY ..... Ernst & Young

FE ..... Financial Expertise

FRQ ..... Financial Reporting Quality

FTE ..... Full Time Equivalent

GAAP ..... Generally Accepted Accounting Principles

GC ..... Going Concern

GE ..... Governance Experience

GER ..... Germany

IA ..... Internal Audit(ing)

IAF ..... Internal Audit Function

IAR ..... Internal Audit Report

ICFR ..... Internal Control over Financial Reporting

i.e. ..... id est

IIA ..... The Institute of Internal Auditors

IIARF ..... The Institute of Internal Auditors Research Foundation

Ind. ..... Independence

[I] ..... Interview Study

JAE ..... Journal of Accounting and Economics

JAR ..... Journal of Accounting Research

JFE ..... Journal of Financial Economics

JLE ..... Journal of Law and Economics

JSTOR ..... Journal STORage

KPMG ..... Klynveld Peat Marwick Goerdeler

Max ..... Maximum

Min ..... Minimum

M. Sc. ..... Master of Science

MTG ..... Management Training Ground

N ..... Number of Observations

NACD ..... National Association of Corporate Directors

NASD ..... National Association of Securities Dealers

NASDAQ ..... National Association of Securities Dealers Automated Quotations

NNM ..... NASDAQ National Market

no. ..... number

NSCM ..... NASDAQ Small Cap Market

NYSE ..... New York Stock Exchange

Obs ..... Observations

oec. ..... oeconomicarum

OECD ..... Organization for Economic Co-operation and Development

p. ..... page

PCAOB ..... Public Company Accounting Oversight Board

pct. ..... percentage

PhD ..... Philosophiae Doctor

Prob ..... Probability

PwC ..... PricewaterhouseCoopers

P25 ..... 25th Percentile

P50 ..... Median

P75 ..... 75th Percentile

RAST ..... Review of Accounting Studies

rer. ..... rerum

[R] ..... Review

SAS ..... Statements on Auditing Standards

SE ..... Supervisory Expertise

SEC ..... U.S. Securities and Exchange Commission

SOX ..... Sarbanes-Oxley Act

SPSS ..... Statistical Package for the Social Sciences

Std. Dev. ..... Standard Deviation

S&P ..... Standard and Poor's

[S] ..... Survey

TAR ..... The Accounting Review

TBL ..... The Business Lawyer

Ten. ..... Tenure

TO ..... Turnover

UK / U.K. . . . . United Kingdom

URL . . . . . Uniform Resource Locator

US / U.S. . . . . United States

USA / U.S.A. . . . . United States of America

VIF . . . . . Variance Inflation Factor

www . . . . . world wide web

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Chapter 1

Introduction

The collapse of several large corporations at the end of the twentieth century and the turn of the twenty-first century has spawned an increase in scientific publications in the corporate governance domain. The topic also came to the forefront of public attention after the turmoil in financial institutions during the global economic crisis in 2008 and has since grown in importance given the increasingly complex environment of businesses (Kirkpatrick, 2009). In addition, there is a wide range of risks executives have to consider. These risks are related to international activities across different legal regimes, heightened investor scrutiny as well as political instability and rapid technological evolution. An important feature of corporate governance is that most these business risks are "[...] understood, managed, and, when appropriate, communicated" (OECD, 2014, p. 7).

Several codes and reports have over time coined the definition of corporate governance across different continents. The *Cadbury Code of Best Practice and the Report of the Committee on the Financial Aspects of Corporate* ("Cadbury Report") was introduced in 1992 and served as a major catalyst of the increasing attention the topic has gained in the subsequent decades. It can be seen as a direct response to a series of corporate scandals in the U.K., including BCCI, P&C, and Maxwell (Parkinson, 1995). According to the Cadbury Report, corporate governance is "the system by which companies are directed and controlled" (Cadbury, 1992). Subsequent corporate governance codes throughout the world adopted its central theme of enhanced board member accountability and corporate transparency.

As part of the traditional shareholder and stakeholder-oriented models, corporate governance is concerned with the coexistence of power and accountability within corporations. These corporations are more precisely described as a nexus of contracts between risk-bearing and decision-making individuals in which the distribution of power is often imbalanced (Shleifer & Vishny, 1997). This constellation requires a framework or system to govern the relationships between different groups of contracting individuals. One such constellation which illustrates the arrangement of contractual relationships and their associated power is that of a corporation's shareholders, directors and managers. Frequently, governance rules regulate the power relationship between these parties by determining the level of discretionary managerial power and director accountability. Gompers, Ishii, and Metrick (2003) provide empirical evidence that firms that follow a democratic path (i.e., strong support of shareholder rights) tend to outperform firms with governance features of a dictatorship (weak support of shareholder rights) in terms of market valuation and operating performance. However, the general effect of corporate governance on firm performance remains ambiguous (e.g., Bhagat & Bolton, 2008).

Another theoretical angle which corroborates the relevance of corporate governance is derived from the principal-agent theory. A central premise of agency theory is that principals delegate control over resources and authority to agents who partly differ from the former in their preferences regarding effort, risk and compensation (e.g., Alchian & Demsetz, 1972; Jensen & Meckling, 1976; Ross, 1973). Such a goal incongruity constitutes the central conflict between principals and

agents in instances where a separation of ownership and control exists. Contracts, as a central delegation mechanism, are used in this setting to illustrate the principals' need for monitoring the informational advantages of agents who tend to behave opportunistically in a state of asymmetrically distributed information (e.g., Bøhren, 1998). Different manifestations of opportunistic behavior include moral hazard and shirking (i.e., the agent spends less effort than required) as well as adverse selection (i.e., misrepresentation of agents' abilities which leads to faulty selection of agents).

Fama and Jensen (1983) illustrate the relevance of oversight mechanisms in this context as they scrutinize how organizational survival is predicated upon the efficiency of contractual structures among its risk-bearing and decision-making agents. For large and complex publicly traded companies, this implies that risk-bearing stockholders delegate decision-making processes to specialized agents within the organization. Efficient contracting also includes the internalization of separate ratification and control mechanisms such as boards of directors. Members of the the board of directors assume a pivotal role as they "[...] always have the power to hire, fire, and compensate the top-level decision managers and to ratify and monitor important decisions" (Fama & Jensen, 1983, p. 311).

Moreover, in light of the crucial relationship between corporate governance and financial reporting quality, the influence of the board of directors is complemented by several additional governance parties (e.g., Farber, 2005). More specifically, external and internal auditors much the same as the audit committee and managers are crucial actors in the financial reporting oversight process. Cohen, Krishnamoorthy, and Wright (2004) arrange all four as interacting parties within the "corporate governance mosaic" to outline their mutual impact on financial reporting quality. The framework also peripherally considers less directly involved outside actors and mechanisms such as regulators, legislators, financial analysts, stock exchanges, courts and the legal system, and stockholders.[1] Figure 1.1 provides an overview of the major stakeholders and their interrelations.

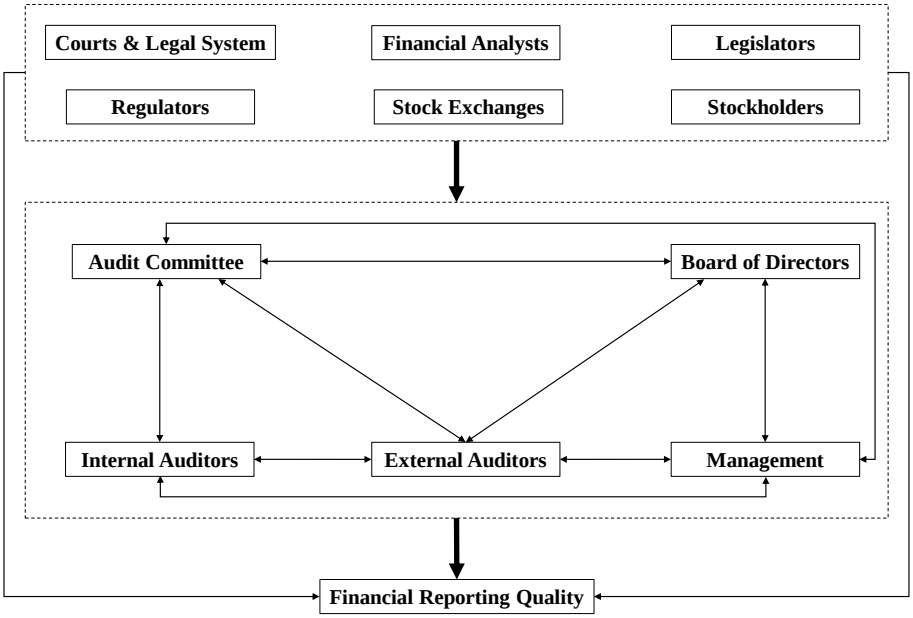
Managers assume an overarching role in the corporate governance mosaic based on their influence on the activities of boards of directors, audit committees, external auditors, and internal auditors. For example, scientific evidence suggests that CEOs intervene in the appointment of board members to retain their sovereignty at the expense of corporate governance and stock prices (Bruynseels & Cardinaels, 2014; Carcello et al., 2011; Cohen et al., 2011; Shivdasani & Yermack, 1999). This is especially valid for powerful CEOs (e.g., Lin et al., 2014; Lisic et al., 2016). Moreover, effective oversight over management is often a reciprocal process in which managers' willingness to promote capable governance mechanisms beyond statutory requirements determines

[1] The influence of these peripheral parties more directly affects the interactions of the four central governance actors (e.g., via laws, recommendations or ratifications).

the overall level of monitoring.[2]

External auditors generally provide independent monitoring to protect the interests of stakeholders that are outside the company's boundary (i.e., the general public or other third parties). The external audit literature (Gaynor et al., 2016, for a review) establishes a strong link between the quality of external audits, as measured by audit process inputs (e.g., audit planning decisions, hours spent and size of the audit firm) and outputs (e.g., audit opinions, restatements and material weakness disclosures), and financial reporting quality (i.e., the extent to which the financial statements reflect the client's underlying economic condition).

Figure 1.1
Corporate governance mosaic and financial reporting quality based on Cohen, Krishnamoorthy, and Wright (2004)



Endogenous monitoring provided by audit committees and internal auditors, on the contrary, is legitimized within the company's boundary via delegation of responsibilities from the board of directors. This difference in authority has important implications. For example, the audit committee monitors not only by supervising accounting choices and discussing inconsistencies with management, but it also relies on exchanges with internal and external auditors to ensure sound internal controls over financial reporting (DeZoort et al., 2002). As such, discussions with internal

[2] For example, management tends to exert significant influence over external auditor appointments, terminations and fee negotiations (Beck & Mauldin, 2014; Gramling, Jenkins, & Taylor, 2010, p. 558). As a consequence, external auditors attribute higher risk to clients with poor management credibility (Cohen, Krishnamoorthy, & Wright, 2002), and internal audit contribution is negligible when empowerment by senior managers is weak (Sarens & De Beelde, 2006b). Accordingly, managers are critical in setting the scene for effective corporate governance.

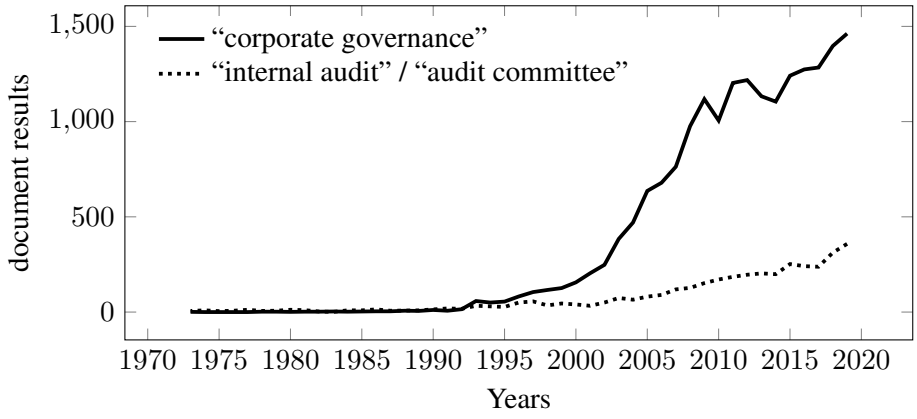
and external auditors and the use of their reports promote the effectiveness of audit committees as both create a strong sense of accountability among its members (e.g., Gendron & Bédard, 2006; Gendron, Bédard, & Gosselin, 2004). External auditors convey valuable audit insights on to audit committee members and have strong incentives to disclose any key matters related to managers' complex and often discretionary decision-making (Fiolleau, Hoang, & Pomeroy, 2019, p. 126). Furthermore, internal auditors provide comfort to audit committees due to their familiarity with the internal control environment and risk management processes, which they gain from assurance and consulting activities carried out in these areas (e.g., Sarens, De Beelde, & Everaert, 2009). Overall, these interrelations suggest that audit committees serve as an important conduit of accounting-related information to the overall board.

The interaction between internal and external auditors, by contrast, is often task-related given the risk of litigation external auditors face in case of an audit failure (e.g., Arel, 2010). More precisely, the use of internal auditors as direct assistants or the reliance on their work during external audits is determined by quality characteristics and working procedures of the internal audit function (AICPA, 2014). Also, internal auditors' scope of activities is inherently broader, including the areas of financial, operational and managerial auditing and consulting services. This merits discussion as to the relationship (substitutive versus complementary) between internal and external auditing (e.g., Anderson, Francis, & Stokes, 1993; Ettredge, Reed, & Stone, 2000). Relatedly, Gramling et al. (2004) construe internal auditing as a "[...] resource to each of the three parties responsible for corporate governance" (Gramling et al., 2004, p. 194). The authors further note that internal audit relationships to governance actors other than the external auditor remain an under-researched area.

After all, there is an ongoing transition of how academic insights affect the implications of the corporate governance mosaic and its theoretical foundations. This transition began at the end of the twentieth century when scientific knowledge on the topic increased in breadth and volume. An illustration of this development is provided by keyword searches on the topic in large databases of peer-reviewed literature. As shown in Figure 1.2, the number of indexed documents in the period between 1972 and 2020 indicates a discernible growth of the corporate governance literature that has yet to reach its saturation point. This ongoing "surge of publications" frequently challenges what is known about corporate governance mechanisms and their interrelationships (e.g., Bebchuk & Weisbach, 2010; Carcello, Hermanson, & Ye, 2011; Denis, 2001; Hambrick, Werder, & Zajac, 2008).

The research streams on audit committees and internal auditing, as two fundamental subfields of corporate governance, show a similar trend. Both streams expanded significantly over time despite clear disparities in terms of structure and content. While an abundance of studies examines determinants of effective audit committees, a similar discussion has focused on internal audit added value and effectiveness but with comparatively fewer studies (e.g., Lenz & Hahn, 2015, for

Figure 1.2
Scopus search results for corporate governance-related keywords (unfiltered results)



Note: Data extracted from SCOPUS, own calculations. Results include articles, books, book chapters, conference papers, reviews as well as editorials and notes.

a thorough overview). Instead, researchers note a scarcity and lack of depth of scientific internal audit insights; some even concluding that "[...] research on the internal audit function (IAF) is still in its infancy" (DeFond & Zhang, 2014, p. 278). These observations have sparked debates on the state and future direction of internal audit research (e.g., Richards, 2006; Sarens, 2014).

Contrarily, research on audit committees is in a well-advanced state. Many prior studies in the audit committee domain have synthesized the literature on audit committee effectiveness characteristics (DeZoort et al., 2002), its significance within the corporate governance mosaic (Cohen, Krishnamoorthy, & Wright, 2004; Turley & Zaman, 2004), independence of audit committee members (Romano, 2004) as well as the influence of regulatory changes on research (DeFond & Francis, 2005). The list of qualitative summary studies is supplemented by different meta-analytical studies that emphasize, in particular, the relationship between audit committee independence and financial reporting quality (e.g., Pomeroy & Thornton, 2008). Additional evidence suggests that other factors, such as audit committee meeting frequency and size as well as financial expertise, influence financial reporting quality (e.g., Lin & Hwang, 2010). However, a major shortcoming of the audit committee research field is that most of its synthesizing review studies are either outdated or concentrate on a specific strand of research (e.g., audit committee independence). As a consequence, scientific insights lack recency or are limited in terms of cohesiveness.

The outlined state of both research streams serves as a starting point for this doctoral thesis. It also provides a compelling case for the introduction of a consolidated overview on the body of knowledge in the two research fields. Thus, a central goal of this thesis is to establish a comprehensive synthesis of research on audit committees and internal auditing. Accounting researchers commonly refer to either meta-analysis or narrative literature reviews to aptly cap-

ture the production of cumulative knowledge within a scientific domain (e.g., Hay & Knechel, 2017; Hay, Knechel, & Wong, 2006). Meta-analytical techniques, in that sense, are seen as a logical extension of qualitative review studies that often present conflicting empirical conclusions (Hunter & Schmidt, 2004, p. 17). As an additional alternative, bibliometric analyses offer a different approach to systematically accumulate knowledge within an established field of research. That is, bibliometric studies encompass the quantitative analysis of bibliographic information of [published] scientific communication that includes but is not limited to author details, references, publication date or type, and sources. Using bibliometric methods for mapping patterns of bibliometric information makes it possible to "[...] examine how disciplines, fields, specialties, and individual papers are related to one another" (Zupic & Čater, 2015, p. 429). Thus, bibliometric analyses provide objective and reliable assessments of the structural composition and relevance of research areas (Campbell et al., 2010). Two of the following four chapters rely on bibliometric methods to map research on audit committees and internal auditing.

By analyzing bibliometric data, this doctoral thesis makes two contributions in the area of "metaknowledge research". Metaknowledge refers to the production of knowledge about knowledge, meaning the identification of explicit scientific claims (e.g., research findings or methodological approaches) across a large body of scientific information (Evans & Foster, 2011). It further allows for inferences about implicit practices, beliefs, strategies and social processes of the research community by analyzing latent sets of bibliometric data (e.g., information about authors and institutions). The latter highlights the context of research, such as collaboration networks, pervasive trends or technological developments. Chapters 2 and 3 study the methodological and conceptual dynamics of audit committee and internal audit research via bibliometric pattern analyses of citations and author information. As a result, chapters 2 and 3 are anchored in the area of metaknowledge research. Regarding the type of explicit content, both chapters build on features of scientific studies published in influential accounting journals.

Furthermore, in light of the still under-researched state of internal auditing, two additional contributions are made in the area of internal audit practices in the European context. This includes the identification of determinants of collaborative audit efforts and the compensation level of chief audit executives. There is currently a lack of clarity as to why internal audit practitioners choose to collaborate with other parties during internal audits in spite of the relevance the topic has attained in the broader spectrum of internal audit co- and outsourcing. Accordingly, Chapter 4 supplements the emerging guidance provided by professional institutions on this matter by investigating the context and drivers of the "joint audit" phenomenon. Also, as an extension to Dezoort, Houston, and Peters (2001), this doctoral thesis provides initial evidence on the structural and procedural factors that determine the payment scheme of chief audit executives. Chapter 5, therefore, draws on the rich body of literature on executive compensation and exploits practitioner-data to provide in-depth insights on how the level of chief audit executive compensation can be determined. The

following chapters of this doctoral thesis, as a result, contribute both on a macro and micro level to two essential streams of corporate governance research.

Chapters 2 and 3 analyze the current state of audit committee and internal audit research and apply a combination of co-citation and social network analysis to investigate the structure of the research community and the prevailing theoretical concepts within both research fields. Chapter 4 discusses the emerging importance of internal audit sourcing arrangements and examines the determining factors that are associated with a joint audit together with external auditors, other external local experts, locally appointed internal auditors or specialist peers from within the organization. Finally, Chapter 5 focuses on the compensation of chief audit executives and is the first empirical study to analyze the fundamental drivers of the internal audit compensation scheme.

Chapter 2 "Four decades of audit committee research: A bibliometric analysis (1977 – 2018)" comprehensively maps the intellectual structure of audit committee research as a combination of citation, co-citation, and social network analysis is used to bibliometrically analyze 92 articles published in six leading accounting journals. In the post-Sarbanes Oxley Act (SOX) era, research on audit committees has evolved into a distinct scientific domain devoted to the analysis of corporate oversight and its effect on financial reporting and internal control quality. Numerous studies have contributed to the identification of potential determinants of audit committee effectiveness and possible performance effects associated with the audit committee oversight process. Nevertheless, the scarcity of studies that offer a holistic view on audit committee research impedes a profound understanding of the antecedent elements and emerging themes in this field within recent decades. The chapter thus contributes to the literature by offering insights on major publication trends, chronological developments, and underlying relationships between different strands of the audit committee literature as part of the accounting discipline. The findings reveal a high level of homogeneity in audit committee-related studies published in the leading accounting journals, especially when it comes to sample selection and methodological approaches.

This chapter is single authored.

Chapter 3 "The evolution of internal audit research: A bibliometric analysis of published documents (1926 – 2016)" addresses the rise of internal auditing in the post-SOX era and examines the scientific transformation of the topic within current accounting research. The chapter sheds light on the existing research themes and core works that have been shaping this topic, we combine co-citation and social network analysis to analyze citation patterns of 170 research articles published in five leading accounting journals between 1926 and 2016. The scientific landscape of internal auditing within accounting research is found to be highly fragmented and partly defined by internal auditors' relationships to other parties of the corporate governance framework. Additionally, results reveal the existence of a research nucleus which emphasizes the increasingly

important construct of internal audit quality.

This chapter is joint work with Professor Dr. Marc Eulerich. It was published in 2019 in Accounting History Review, volume 29 (issue 1), pages 103 – 139.

Chapter 4 "Breaking the barrier: On the use of joint audits in the internal audit profession" empirically investigates the circumstances that urge internal auditors to perform audits together with functional experts from within or outside of the organization. These joint audits serve as ad hoc resource augmentations and represent a viable alternative to additional staff purchases or even a full outsourcing of the internal audit function (IAF). This is based on the notion that with the growing importance of internal auditing, academics and practitioners emphasize the importance of an adequate and adaptable staffing approach of the function. Moreover, internal audit resources are considered a crucial component of internal audit quality. Using survey data from three national chapters of the Institute of Internal Auditors, we consider three IAF dimensions (structure and resources, activities and processes, environmental factors) associated with resource augmentations. Our findings provide evidence that internal auditors engage in joint audits when the IAF is comparatively small and competent, and when internal audit focus lies on risk and strategy-related tasks. Our findings further suggest that decentralizing the IAF provides incentives for joint audits.

This chapter is joint work with Professor Dr. Marc Eulerich.

Chapter 5 "Compensation of internal auditors: Empirical evidence for different impact factors" examines the different factors which impact the compensation level of chief audit executives (CAE) and sheds light on often unobservable and, therefore, opaque drivers of CAE remuneration. An ordered logistic regression is used to analyze the effects of internal audit function competences, stakeholder relationships, and firm complexity on the CAE compensation using survey data from 212 CAEs from a broad spectrum of companies and industries. The results of the study identify IAF competence and independence as fundamental drivers of CAE compensation and provide evidence that firm complexity in terms of foreign sales, listing status and need for monitoring constitute additional salary determinants related to the IAF environment. Our results are based on questionnaire data and subject to a possible response bias as they rely in part on the participants' assessment of a given situation. This paper provides a benchmark for CAE compensation levels in Austria, Germany and Switzerland and offers insights on different company and IAF inherent factors that can be associated with varying salary outcomes. This study is the first to investigate the factors driving the overall compensation level of CAEs and by providing empirical evidence regarding determinants of CAE compensation.

This chapter is joint work with Professor Dr. Marc Eulerich, PhD Tatiana Mazza and M. Sc. Ronja Krane. It was published in 2019 in Corporate Ownership & Control, volume 17 (issue 1), pages 336 – 349.

Chapter 2

Four decades of audit committee research: A bibliometric analysis (1977 – 2018)

2.1 Introduction

The central pillars of the corporate governance framework have come under considerable scrutiny in the course of recent corporate governance scandals that include Enron, Worldcom, or Volkswagen. As for the consequences of several oversight-related failures, internal and external governance functions are increasingly affected by regulatory interventions. For example, the Sarbanes-Oxley Act (SOX) has explicitly focused on the Audit Committee (AC) by mandating independence and extensive disclosures on the financial expertise of its members (DeFond, Hann, & Hu, 2005, p. 17). The AC is of particular relevance to the question of whether or not an effective monitoring of a company can be ensured.

However, despite a rapidly growing body of literature on the AC over the past decades, little consensus exists on the profound drivers of an effective AC or an AC's value.[1] For example, Romano (2004) examined 16 studies on the ramifications of AC independence, noting that the literature not only fails to establish a relationship between AC independence and firm performance or financial reporting quality but that harmful effects on performance might occur with higher levels of independence. Other syntheses of the AC literature provide a comprehensive discussion of pre-SOX AC research while only peripherally tracking the developments in the time after the passage of the law (Cohen, Krishnamoorthy, & Wright, 2004; DeFond & Francis, 2005; DeZoort et al., 2002; Turley & Zaman, 2004). The existing perspectives on this topic are diverse and often centered around specific concepts, ranging from studies on AC composition, responsibilities, resources, and motivating factors while also analyzing their impact on different accounting outputs. Moreover, the applied methodologies in these studies cover both qualitative and quantitative approaches. Addressing these issues of AC research, our study attempts

- to provide a structural analysis of the fragmented AC literature, and
- to uncover and investigate the interrelation between various streams of AC research in the periods before and after SOX.

We, therefore, conduct a bibliometric analysis based on data extracted from 92 AC studies published between 1977 and 2018 in the six leading accounting journals. While traditional literature reviews classify research articles based on preexisting or individually derived frameworks, our empirical approach overcomes the subjective categorization of knowledge prevalent within existing reviews. Using a combination of citation, co-citation, and social network analysis enables us to offer a detailed overview of the scientific communication in this field. Thus, we contribute

[1] A google scholar query on articles with the term "audit committee" in the title reveals a steady increase in the number of available documents, with 17 search results in 1990 and 55 in 2000 to 246 results in 2018.

to the literature by offering insights on historic and current AC research and by identifying relevant relationships. Our findings reveal a high level of homogeneity within existing AC research, especially when it comes to sample selection and empirical methodology. We also note that the conventional approaches prevalent in AC research mainly operationalize an input-output relationship. The actual oversight process of ACs, however, is infrequently considered in the existing publications. Our study contributes to the current AC research since we offer new insights and perspectives based on empirical results from our bibliometric analysis and open multiple research perspectives.

Our study facilitates a clearer understanding of interrelations among existing studies and uncovers research gaps that are yet to be explored. Our results consequently constitute a fundamental contribution to the assessment and classification of the existing AC literature, helping researchers across multiple scientific disciplines to familiarize themselves with the scientific perspective on AC practices and to connect future studies to the essential body of AC research.

This article is structured as follows. Following our introductory remarks, section 2.2 comprises a brief presentation of the existing state of research on ACs, before section 2.3 introduces the methodological approach of bibliometric analysis. This section also describes the data selection process and breaks down the sample of journals and articles analyzed to construct our final set of citation data. Subsequently, section 2.4 presents the results of the bibliometric analysis and the co-citation network. The concluding section 2.5 discusses the main results and infers central implications.

2.2 Prior literature and conceptual framework

The regulatory environment of ACs is predominately characterized by provisions of SOX. SOX defines the AC as "a committee (or equivalent body) established by and amongst the board of directors of an issuer for the purpose of overseeing the accounting and financial reporting processes of the issuer and audits of the financial statements of the issuer" (U.S. Congress, 2002). The responsibilities of ACs and their members have consequently increased considerably over the last years. This expanded scope of responsibilities is also referred to in the Deloitte (2018) "Audit Committee Resource Guide", which defines the typical duties of ACs as follows:

- "Oversee the integrity of the financial reporting process
- Oversee the process for identifying and addressing financial and related risks
- Ensure the company has policies and programs to prevent and detect fraud
- Oversee earnings releases, as well as the financial information and earnings guidance provided to analysts and ratings agencies

- Support a culture that embraces the importance of ethics and compliance and develop a process for investigating related allegations
- Oversee the internal auditors and their audit plan
- Appoint, compensate, and oversee the independent auditors
- Discuss with the independent auditors those matters required to be communicated under applicable auditing standards."

However, the activities mentioned above only partially explain ACs' day-to-day practices and duties as both the specific company characteristics as well the ACs' actual oversight process can vary substantially.

For the integration of the multitude of different AC activities, commonly used conceptual frameworks focus on specific characteristics of AC members, the AC oversight process, and AC effectiveness (ACE) as an output. A possible extension can be the inclusion of company characteristics. While the company and AC member characteristics represent the input factors, the oversight process itself is the throughput. In contrast, effective internal controls and improved financial reporting quality can be understood as ACs' output. Several studies describe and analyze the input-throughput-output relationship that characterizes ACs.

For example, DeZoort et al. (2002) investigate different determinants of ACE by creating a framework that categorizes existing studies on the topic based on the four categories composition, authority, resources, and diligence. While the first three capture the "input" of AC practices, AC diligence refers to the "process factor" (throughput), which represents the collective willingness and effort of AC members to achieve sound financial reporting quality and stakeholder protection. Taken together, composition, authority, resources, and diligence constitute ACE as the final "output factor". Through the analysis of 49 empirical articles in accounting, the authors synthesize the literature within these categories to uncover research needs and opportunities. As a central implication, future authors are encouraged to address more fundamental issues of AC research to enhance the knowledge about ACE.

Gendron and Bédard (2006), in their article on perceived accountability of AC members, investigate the "black box" of effective ACs (described as a set of rituals and procedures to establish a sense of effectiveness among AC members). Conducting semi-structured interviews with different actors in the corporate governance mosaic of three Canadian corporations, the authors highlight AC members' practice of "constructing meanings of effectiveness", especially during formal and informal meetings. The study concludes that a sense of ACE among committee members is derived from a subset of reflective actions, such as asking critical questions and engaging in informal discussions before meetings that often elude generalizable and objective measurement by researchers. A significant opportunity for future research identified by the authors is the judgment

processes of AC members.

Beasley et al. (2009) scrutinize two conceptually contrasting theories (agency and institutional theory) for their interview study on the "throughput" of the AC oversight process. The authors critically discuss the existing body of literature, noting that it "[...] largely fails to examine the process used by audit committees as a whole or by individual audit committee members when fulfilling their oversight responsibilities" (Beasley et al., 2009, p. 66). The study consequently relies on a qualitative approach to investigate the extent of ceremonial versus substantial oversight procedures of AC members as well as their central underlying behavioral processes. While the final analysis reveals considerable variation in AC oversight practices, a consistent observation presented is that most ACs have shifted their focus towards financial expertise in the post-SOX era.

Nevertheless, several prior studies (e.g., Abbott, Parker, & Peters, 2004; Bédard, Chtourou, & Courteau, 2004; Bronson et al., 2009; Klein, 2002a; Krishnan & Visvanathan, 2008) build on the input-output-relationship, where specific input factors, such as independence or expertise, are scrutinized regarding their ability to influence output effects, such as earnings manipulation, fraud, or internal control quality. The majority of the existing AC research focuses on input-output or input-throughput-output relationships from an archival perspective. In contrast, qualitative studies cover especially the throughput-process without including additional input or output dimensions. As a consequence, prior AC research seems to be fragmented so that a more holistic overview is required. Given the deliberations above, our bibliometric approach combines both perspectives as it visualizes the underlying concepts, theories, and topics and weights their importance.

2.3 Bibliometric analysis

2.3.1 Methodology

Bibliometric analyses assist authors in conceiving a field of research in its fundamental nature (White & McCain, 1998). King (1987) summarizes simple forms of bibliometric analyses as counting publications and analyzing (weighted) citations. As for more sophisticated approaches, co-citation analyses record the cooccurrence of data within underlying publications. Finally, social network analysis (bibliographic coupling) assumes similarities of publications based on matching references. As the essential tools, citation, co-citation, and social network analyses are used to transform and arrange the collected bibliometric data into organized output formats.

Citation analysis examines the literature references cited within publications and therefore provides a measure on the relevance of either a source or an author associated with the publication. It further provides a rudimentary level of analysis of the data structure as it indicates the popularity of each included source (e.g., Garfield, 1972) For this purpose, all references quoted in the publications considered are recorded and arranged in a matrix with the dimensions "considered

publications" and "cited sources". Reference lists include the entirety of all cited sources such as journal articles, monographs, contributions to editorships, relevant laws, and working papers. From this database, the citation frequency of each source and author, as well as their associated impact in the research area under consideration, can be determined.

Co-citation analyses capture the simultaneous appearance of two or more cited references in a publication and rely on several assumptions. First, a co-citation occurs when two documents are cited together in a third document (e.g., Egghe & Rousseau, 2002). This cooccurrence is assumed to indicate a cognitive association between both co-cited documents.[2] Second, the frequency of co-citations indicates the strength of the documents' cognitive relationship. A co-citation represents a measure that reflects on the contextual proximity of several publications as related to a theory, a topic, a methodology, or an empirical field. Arranging the co-cited documents within clusters further facilitates the illustration of the research field's intellectual structure and specialties as well as communications between involved researchers (e.g., Garfield, 1979). For the co-citation analysis, the initial matrix of the citation analysis is transformed into a symmetric co-citation matrix. The latter records the frequency of a document's cooccurrence and, at the same time, the number of source publications from which the cooccurring documents emerge.[3]

In addition, the integration of bibliometric data into social network analysis offers an illustration of existing bibliometric relationships by mapping the scientific dialogue of authors involved in the field (e.g., Small, 1973). This visual-directed representation of the cognitive research structure outlines central publications based on their frequency of appearance. The validity of this approach lies in the notion that an author's provided publications constitute the scientific basis on which a delineated strand of research has evolved or is currently establishing itself. A publication's subsequent citation hence signifies further exchanges of information in the academic discussion of a topic, thus capturing reliable and valid conclusions about the developments and interdependencies within a scientific realm. Citations, therefore, provide a useful and reliable indicator for the exchange of information within the research community.

Considering the value of bibliometric analyses, their scientific impact is twofold (e.g., Steven, 1983). On the one hand, they allow for a comprehensive exploration of individual areas of research by processing bibliometric information of publications such as titles, abstracts, citations, or author

[2] Reasons for a citation may include, for example, the subject matter, the methodology of the publication, shared academic backgrounds of citing and cited authors, the citation at the request of an editor, or the existence of citation cartels.

[3] In individual cases, publication lists may be flawed or incomplete, and citations occur out of courtesy or lack of sound scientific justification. However, the impact of these erroneous but often unsystematic cases on statistical citation metrics is highly dependent on the constructed database's quality. Relatedly, the use of rules on bibliometric regularities serves as an indicator for the validity of a database and its included (co-)citations. At the level of the selected journals, the contributions included in the analysis should follow Bradford's law and, at the author level, should confirm Lotka's law.

information. Within these strands of research, the method also illustrates relationships (via cluster analysis) between existing sub-topics and allows for a detailed assessment of interdependencies (e.g., Culnan, 1986). On the other hand, bibliometric analyses serve as an evaluation mechanism that highlights the perceived importance of previous publications and the development of an entire field of research by quantifying scientific outputs and citations. The method consequently helps to connect both direct and rather indirect relationships of a distinct field of research (see, e.g., Raisig, 1962; White & McCain, 1998).

The formation of clusters as part of network analysis is mostly explorative and applies multivariate data analysis to organize co-cited documents in homogeneous groups based on their similarities (Leydesdorff, 2008). The clustered groups can be visualized by bibliometric software, such as VOSviewer. Network similarity is measured as the relative cooccurrence of two documents within the set of analyzed articles (see Van Eck & Waltman, 2009). Using a relative measure of similarity is a major approach to analyze clusters as it groups items according to a corresponding attribute. In contrast, establishing a cluster based on absolute co-citations bears the risk of distorted information as low absolute co-citation values frequently prevent a document's assignment to a suitable cluster (despite their content being closely related to the source material). Consequently, to set the absolute number of co-citations of a source into context of its co-cited source, its relative strength of association (association strength) is defined by the ratio

$$Association\ Strength = \frac{c_{ij}}{(s_i s_j)} \tag{2.1}$$

where c_{ij} corresponds to the number of co-citations of the sources *i* and *j* and s_i and s_j coincide with the total number of citations of *i* and *j*, respectively. The relative degree of similarity is to be interpreted as a probabilistic similarity measure, which has proven to be a particularly suitable method for normalization in co-citation analyses.

We use co-citation analysis, together with the methods of social network analysis (i.e., clustering, mapping), to achieve a coherent overview of the diverse and continuously evolving AC literature within accounting research. The statistical approach of network analysis also visualizes relationships and patterns among cluster-elements (i.e., audit committee-related citations) within the literature-based network.

2.3.2 Data

Our data collection process is in line with prior bibliometric studies (e.g., Hota, Subramanian, & Narayanamurthy, 2019; Lampe, Kraft, & Bausch, 2019; Martínez-López et al., 2018; Pilkington & Meredith, 2009; Stout et al., 2018) and focuses on the most influential accounting research journals (Brown, 1996). Following the 2016 Financial Times research ranking, we concentrate on the most highly ranked accounting journals. The six journals we accordingly chose are *Accounting, Orga-*

nizations and Society (AOS), *Contemporary Accounting Research (CAR), Journal of Accounting and Economics* (JAE), *Journal of Accounting Research* (JAR), and *Review of Accounting Studies* (RAST) as well as *The Accounting Review* (TAR). As a next step, we use keywords to identify relevant articles within the set of journals. The final data consists of 92 qualitative or quantitative publications on ACs, which extends earlier AC literature synthesizes that regularly focus on archival studies (e.g., DeZoort et al., 2002).[4] To further reconcile the "fit" of each selected article, two researchers independently assessed all titles, provided terms or keywords as well as the document summaries and abstracts. In some cases, articles had to be reread and thoroughly discussed with several other researchers to achieve consistency. Moreover, studies were also included whenever a substantial part of the text was devoted to ACs. The following keywords were used to identify relevant articles on AC research:

- Audit Committee
- Board (of Directors)
- Oversight
- Corporate Governance

We subsequently gathered information on the citations, research method, year of publication, and publication outlet of the 92 AC articles. The SCOPUS database yielded bibliometric data on 3,106 documents that were cited 5,208 times throughout the set of AC articles. A reliable and unique identifier for each data entry was created by combining titles and publication dates of each citation. However, 972 documents had insufficient data preventing us from creating an identifier. We hand-collect titles and/or dates for 886 of these publications leading to a final sample of 5,122 bibliometric citations. The process of data collection is outlined in detail in Table 2.1.

In addition to these selection and collection steps, basic rules on the distribution of publications were considered to validate the bibliometric data set. When looking at the database, it is noteworthy that the distribution of contributions to each journal follows Bradford's Law.[5] Applying Bradford's Law to any bibliometric database follows the assumption that very few journals should exist in which the vast majority of articles considered relevant are being published.

As for the database used in this study, three groups can be identified: Group one consisting of TAR and CAR with 61 contributions; group two consisting of AOS, JAE and JAR with 27

[4] We provide additional details on the collected documents in Appendix 2.A.

[5] Bradford's Law describes, as a law of power, the distribution of the contributions on a scientific subject area among core journals as well as thematically related field journals. According to Bradford's Law, the same number of documents on a given topic should allocate itself to groups of k, k · b1, k · b2 [...] k · bn, respectively, in various journals, with the journals moving increasingly thematically (Bradford, 1934). The parameter k corresponds to the number of core magazines, and the parameter b denotes the Bradford multiplier.

Table 2.1
Data collection and analysis process

Used databases: EBSCOhost, JSTOR, ScienceDirect, SCOPUS, Wiley	
Keywords: Audit Committee, Board (of Directors), Oversight, Corporate Governance	
Covered journals: *AOS* (1975 - 2018), *CAR* (1984 - 2018), *JAE* (1978 - 2018), *JAR* (1963 - 2018), *RAST* (1996 - 2018), and *TAR* (1926 - 2018)	
Number of articles with a discernible audit committee focus (within at least a subsection)	92
Total number of extracted citations (via the SCOPUS database or manually)	5,208
Number of missing bibliometric citation data (i.e., article title, publication year)	972
Number of manually supplemented bibliometric citation data	886
Number of irretrievable bibliometric citation data	86
Final sample of bibliometric citation data (as extracted from each article via the SCOPUS database or manually)	5,122
Number of unique extracted (referenced) documents	3,106
Citation dimension of the final VOSviewer co-citation matrix	3,106 x 3,106
Result: Mapped co-citation network consisting of 94 frequently co-cited documents	

contributions; and group three consisting of one remaining journal (RAST) with a total of four contributions. Therefore, Bradford's Law is fully valid for the citation database on AC research. As a result, and despite not covering all the specialist journals, a citation index that is valid according to bibliometric standards can be established and evaluated empirically.

2.4 Results

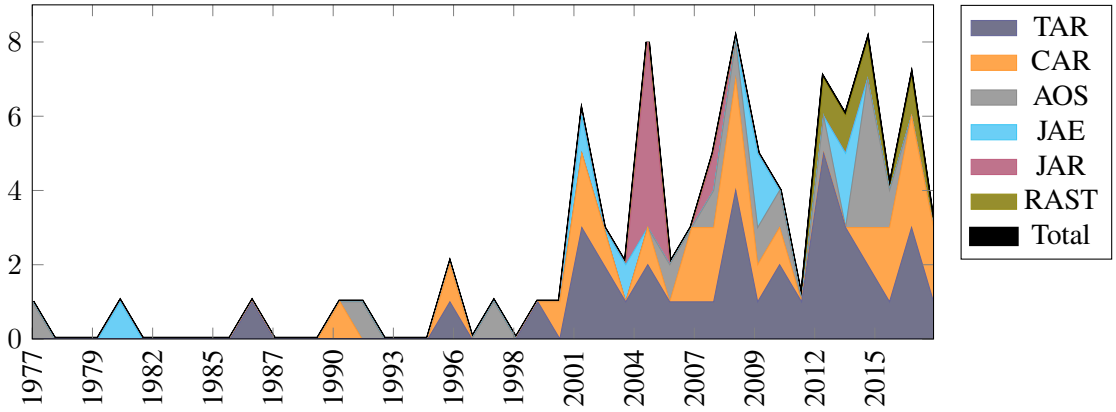
The following section presents our descriptive results from the AC research analysis in the top-six accounting journals. The descriptive results are followed by citation and co-citation analyses to describe the content of eight distinct co-citation clusters. These clusters classify a total of 94 cited documents that exhibit frequent co-citations across the initial set of 92 citing articles.

2.4.1 Descriptive results

During the investigated span of 42 years, 92 different publications with a strong focus on ACs appear in the six leading accounting journals. The average number of publications between 1977 and 2018 is 2.19 per year. Especially during the period before the year 2002 and the regulation of SOX, AC research was published infrequently in the leading accounting journals (ten publications until 2001 and six in the year 2002). However, the post-SOX era marks a discernible increase in

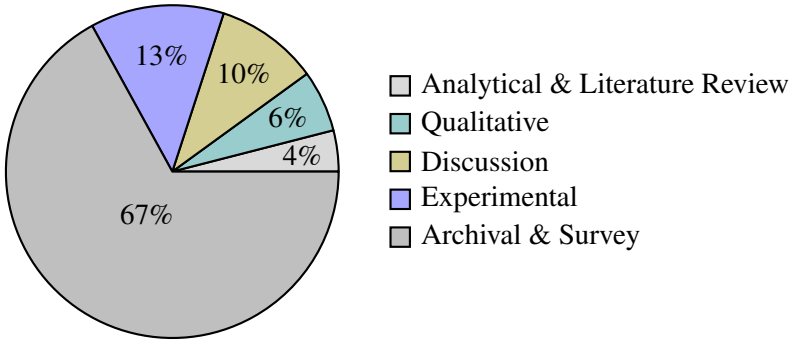
AC research publications. With a total of 76 articles in the following 16 years, the average number of publications is 4.75 per year. Figure 2.1 presents a chronological graph on the distribution of published articles in the top-six journals.

Figure 2.1
Distribution of AC-related articles published in the leading accounting journals



The distribution of published AC-related articles in the journals underlines the dominance of TAR with 37 publications, followed by CAR (24 publications) and AOS (14 publications). JAE (seven publications), JAR (six publications) and RAST (four publications) are characterized by an infrequent publication pattern of AC-related research in the considered time frame. We additionally categorized the methodologies of all 92 source articles, noting a strong prevalence of archival and survey research (67 %). Figure 2.2 summarizes the methodological approaches of the 92 AC research articles. 13 percent of the latter use an experimental approach. Furthermore, a total of ten percent of all articles can be subsumed under the category of discussion papers.

Figure 2.2
Methodologies of AC-related articles published in the leading accounting journals



Note: Information on methodological approaches was collected directly from 92 AC-related studies published in the leading accounting journals.

Another six percent of all source articles rely on qualitative methods (e.g., interview or field studies) to investigate AC-related topics. With only four percent, analytical studies (3 %) and literature reviews (1 %) are limited to a small fraction of publications. The covered samples of the 92 articles are distributed as follows. 78 studies use a U.S. sample, two studies use a Canadian sample, and three studies rely on data from either Sweden, China, or Australia. The remaining articles are either conceptual, analytical, or review studies. Thus, 94 percent of the empirical studies use a U.S. data set. As a supplement to the descriptive results, an additional citation and co-citation analysis was conducted. The results are presented in the next chapter.

2.4.2 Citation, co-citation and cluster analysis

A total number of 3,106 unique sources were cited 5,122 times throughout the 92 analyzed studies. Of the unique sources, 2,431 were cited once (78 %), while 321 were cited two, 140 three, and 214 more than three times. Thus, a high concentration of citations for a relatively small amount of sources is observable.

Table 2.2 presents the top ten cited sources from this sample. The list includes regulatory provisions (U.S. Congress, 2002), theoretical works (e.g., Fama & Jensen, 1983; Jensen & Meckling, 1976) as well as empirical studies (e.g., Carcello & Neal, 2000; Klein, 2002a). Six of the top ten sources are published in the pre-SOX and four sources are published in the post-SOX era.

Table 2.2
Top ten cited publications in AC-related articles

Article	Year	Journal	Total Citations
Klein (2002a)	2002	JAE	33
Beasley (1996)	1996	TAR	31
BRC (1999)	1999	TBL	29
Dechow, Sloan, and Sweeney (1996)	1996	CAR	28
Fama and Jensen (1983)	1983	JLE	27
DeFond, Hann, and Hu (2005)	2005	JAR	25
U.S. Congress (2002)	2002	-	24
Jensen and Meckling (1976)	1976	JFE	23
Abbott, Parker, and Peters (2004)	2004	AJPT	21
Carcello and Neal (2000)	2000	TAR	21

Note: AJPT: Auditing - A Journal of Practice & Theory, CAR: Contemporary Accounting Research, JAE: Journal of Accounting and Economics, JAR: Journal of Accounting Research, JFE: Journal of Financial Economics, TAR: The Accounting Review, TBL: The Business Lawyer, JLE: Journal of Law and Economics.

In addition to the descriptive analysis, we explore the inherent structure of the AC research landscape through an analysis of the co-citation patterns. Our co-citation matrix for the calculation

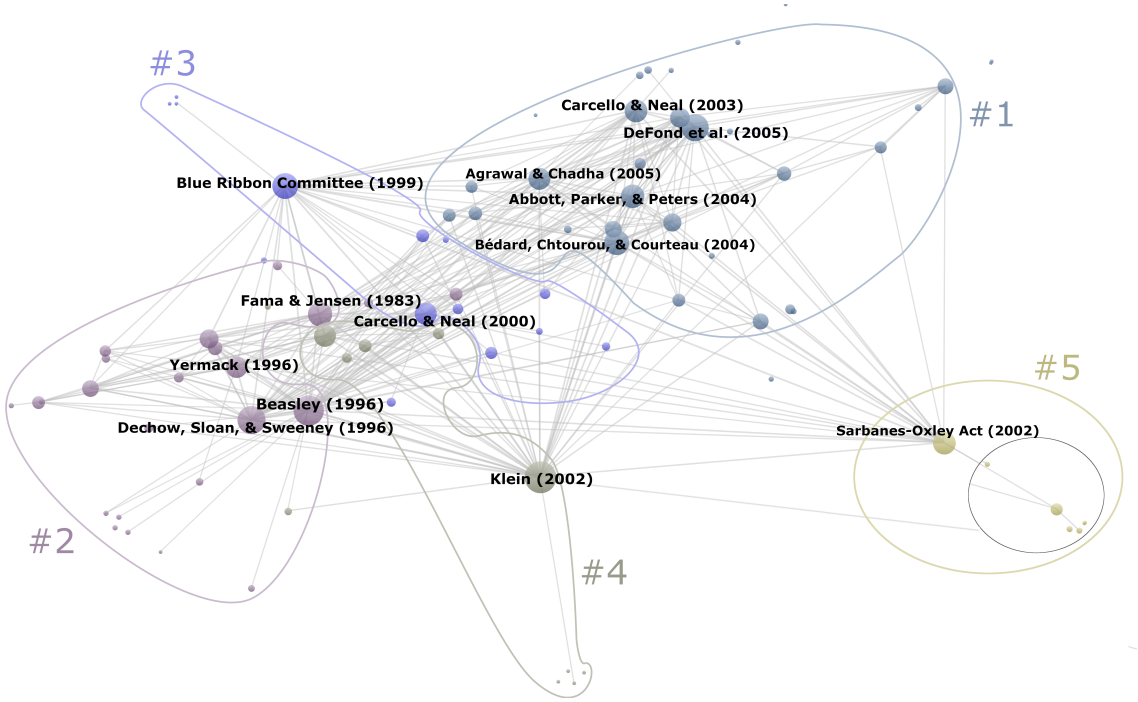
of a two-dimensional co-citation network consists of 3,106 unique references. By visualizing the nexus of frequently co-cited documents, we aim to generate a comprehensive overview of the body of AC research in the top accounting journals. We set the minimum link strength to five as we note that a smaller value limits the interpretability of the network considerably while larger values further obfuscate relationships between different clusters.[6] A document is accordingly included in the final network if it is cited together with another document for at least five times within our set of referencing journal articles.[7] Albeit the fact that no theoretical guidance for the optimal link strength exists, our chosen threshold of five eliminates substantial randomness in the generated output map as it reduces the network to a consistent core of 94 co-cited items. This approach is also used in comparable studies (e.g., Behrend & Eulerich, 2019; Lampe, Kraft, & Bausch, 2019; Lohmann & Eulerich, 2017).

Based on our social network analysis, Figure 2.3 exhibits the results of the final co-citation network. We map the sources based on the co-citation strength between two cited documents to determine the network structure and the position in a specific cluster. Our clusters represent a group of closely related items (i.e., frequently co-cited documents) within a network. Following Behrend and Eulerich (2019), "[...] this technique has the underlying assumption that distinguishable subdomains of the studied research field are identifiable based on the intensity of co-citation activities within the network." Our empirical analysis divides the 94 sources in our network into eight different clusters, where every cluster covers a specific area of AC research. The cluster analysis consequently processes the 3,106 unique source articles to form a total of five clusters that cover 94 highly co-cited documents. The largest cluster 1 contains 33 sources, whereas the smallest cluster (cluster number four) consists of only eleven sources. The distribution of items per cluster has a mean of 18.8. In addition, overview tables are included in each of the subsequent cluster descriptions (Tables 2.3 to 2.7) to highlight the most relevant documents within each network cluster.

[6] The link strength indicates the number of times that two sources occur jointly in a list of references of articles published in the leading accounting journals.

[7] From a technical viewpoint, it is necessary to reduce the co-citation data by setting a minimum number of co-citations so that only relevant and systematic co-citations remain. The definition of the minimum number of co-citations does not follow any predetermined formula but takes into account the individual structure of the data set. More precisely, a reasonable threshold level should exclude random or erroneous co-citations while at the same time maintaining a comprehensive and recognizable network structure that includes any informative relationships (for a critical discussion, see Hicks, 1987). This approach similarly applies to our database. Given that most of the included documents are cited at least three times, the minimum number of relevant co-citations is set to five, which results in a co-citation network that consists of a total of 94 sources.

Figure 2.3
Co-citation network of AC-related articles published in the leading accounting journals



Note: The nodes represent 94 highly co-cited documents within audit committee-related articles. A thicker node equals a higher number of co-citations with other items of the network. Links (illustrated as lines) between nodes indicate the number of co-citations of two documents. A thicker link indicates a higher co-citation frequency.

Cluster 1: Audit committee characteristics [post-SOX]

Cluster 1 consists of 33 articles published between 1995 and 2010.[8] The main focus of this cluster lies on publications that examine a broad array of AC member characteristics. In doing so, various characteristics, such as financial expertise, independence as well as additional AC qualifications, are included as independent variables in the empirical models of several cluster documents. Most of the latter intend to analyze the impact of AC characteristics on financial reporting quality measures, internal control over financial reporting issues, or auditor dismissals. Nevertheless, besides typical quantitative studies, numerous qualitative studies (e.g., Beasley et al., 2009) are included in this cluster. Nearly all of these studies, except for two published during the time before SOX, rely on the unique effects of SOX regulations to establish a framework for audit committee oversight and to scrutinize the effects of this new regulation on financial reporting quality, internal or

[8] Only two documents were published before the passage of SOX and three in the same year. With only two of these five documents exhibiting a clear focus on the AC, the cluster essentially covers AC research in the post-SOX era.

external auditing, or corporate governance. Furthermore, a small number of documents emerge within the cluster that further manifest the regulatory implications of SOX (e.g., General Accounting Office, 2002; Securities and Exchange Commission (SEC), 2002, 2003a). The five studies with the strongest links are DeFond, Hann, and Hu (2005) (43 links and 328 total link strength); Bédard, Chtourou, and Courteau (2004) (36;264); Abbott, Parker, and Peters (2004) (33;231); Carcello and Neal (2003) (30;215); and Agrawal and Chadha (2005) (28;203). In their studies, DeFond, Hann, and Hu (2005) discuss capital market reactions on changes in the composition of ACs, especially in instances where AC members exhibit financial expertise. Bédard, Chtourou, and Courteau (2004) study the relationship between the general expertise of AC members, as well as the independence and level of activity, on aggressive earnings management. Furthermore, Abbott, Parker, and Peters (2004) consider AC characteristics and financial statement restatements, whereas Carcello and Neal (2003) introduce auditor dismissals as a dependent variable in this context. Agrawal and Chadha (2005), in their article, provide a rich overview of the effects of corporate governance on accounting scandals and explain why good governance mechanisms, such as independent ACs, mitigate the risks of scandals and cases of fraud.

Other documents in this cluster include a variety of relevant aspects. For example, Srinivasan (2005), focusing on the role of outside directors, scrutinize the effects of financial reporting failures on board and audit committee turnover. Linck, Netter, and Yang (2009) have a strong focus on the effects of SOX on a firm's hiring of board members. DeZoort et al. (2002) is a review study about the potential determinants of ACE, and Kothari, Leone, and Wasley (2005) and Larcker and Rusticus (2010) are methodological studies that discuss the use of instrumental variables (Larcker & Rusticus, 2010) and the usefulness of different proxies for earnings management (Kothari, Leone, & Wasley, 2005).

The arrangement of the cluster documents within the network signals a profound impact on the research community of post-SOX studies that examine AC characteristics. With only two exceptions, all AC-related cluster studies were published after 2002, indicating a seamless extension of the DeZoort et al. (2002) pre-SOX perspective on effective ACs. Appendix 2.B summarizes the main results of every AC-related article in this cluster.[9] 18 of the 25 considered documents rely on an archival approach while only six studies pursue a qualitative approach (i.e., semi-structured interviews or literature reviews). As for the former, most authors in the archival realm adopt the conceptional framework established by DeZoort et al. (2002). However, a majority of the empirical models reflect a rather narrow interpretation of the framework's suggested determinants

[9] This includes studies that report on AC-related topics. Unrelated cluster documents that discuss methodological issues (e.g., Dechow, Ge, & Schrand, 2010; Kothari, Leone, & Wasley, 2005; Larcker & Rusticus, 2010) or are unrelated to ACs (e.g., Ashbaugh-Skaife, Collins, & Kinney, 2007; Westphal & Zajac, 1995) as well as broader regulatory publications (e.g., General Accounting Office, 2002; Securities and Exchange Commission (SEC), 2002, 2003a) are omitted from the summary.

Table 2.3
Cluster 1: Frequently co-cited documents in AC-related articles

Article	Cluster	Links	Total link strength
DeFond, Hann, and Hu (2005)	1	43	328
Bédard, Chtourou, and Courteau (2004)	1	36	264
Abbott, Parker, and Peters (2004)	1	33	231
Carcello and Neal (2003)	1	30	215
Agrawal and Chadha (2005)	1	28	203
Krishnan (2005)	1	24	166
SEC (2003a)	1	21	140
Srinivasan (2005)	1	17	105
Farber (2005)	1	17	117
Beasley et al. (2009)	1	16	102
Krishnan and Visvanathan (2008)	1	13	86
Xie, Davidson, and DaDalt (2003)	1	12	76
DeZoort et al. (2002)	1	11	68
Anderson, Mansi, and Reeb (2004)	1	11	66
McMullen and Raghunandan (1996)	1	11	61
Dhaliwal, Naiker, and Navissi (2010)	1	9	58
Zhang, Zhou, and Zhou (2007)	1	8	47
Kothari, Leone, and Wasley (2005)	1	7	35
DeFond and Francis (2005)	1	4	20
SEC (2002)	1	4	21
Ashbaugh-Skaife, Collins, and Kinney (2007)	1	4	21
Vafeas (2005)	1	3	15
Hoitash and Bédard (2009)	1	3	15
Cohen, Krishnamoorthy, and Wright (2010)	1	3	18
Doyle, Ge, and McVay (2007a)	1	3	15
Larcker and Rusticus (2010)	1	3	15
Carcello et al. (2006)	1	2	10
Cohen, Krishnamoorthy, and Wright (2004)	1	2	11
Linck, Netter, and Yang (2009)	1	2	10
General Accounting Office (2002)	1	1	5
Gendron and Bédard (2006)	1	1	5
Dechow, Ge, and Schrand (2010)	1	1	5
Westphal and Zajac (1995)	1	1	5

Note: Links indicate the number of existing co-citations of a document with other documents of the network. Total link strength indicates the total strength of the co-citations of a document with other network documents.

(composition, authority, resources, and diligence). For example, a triangulation of AC diligence, independence, and financial expertise serves to flesh out the effectiveness concept in 13 of the 18 archival publications (e.g., Abbott, Parker, & Peters, 2004; Carcello & Neal, 2000; DeFond, Hann, & Hu, 2005; Dhaliwal, Naiker, & Navissi, 2010; Vafeas, 2005). Also, the reported effects on financial reporting quality remain ambiguous as Dhaliwal, Naiker, and Navissi (2010) and Carcello et al. (2006) find positive effects for financial expertise and independence, whereas Abbott, Parker,

and Peters (2004), Carcello and Neal (2000), and Vafeas (2005) align on diligence and financial expertise as relevant determinants. This inconclusiveness is further exacerbated by the inconsistent introduction of additional effectiveness measures, such as AC tenure (e.g., Vafeas, 2005) or the presence of supervisory experts (e.g., Hoitash & Bédard, 2009). Moreover, surprisingly few studies integrate measures on AC authority (e.g., disclosures to outline AC responsibilities), while the few that do so report a discernible impact of the concept (e.g., Bédard, Chtourou, & Courteau, 2004). The infrequent separation between accounting and non-accounting financial experts in some of the cluster studies further obfuscates the effectiveness-construct. For example, Hoitash and Bédard (2009), Carcello et al. (2006), and Krishnan and Visvanathan (2008) all report favorable outcomes for the presence of the former on ACs, while other studies refrain from differentiating between accounting and non-accounting financial experts. On the one hand, this indicates an emerging stream of research on AC accounting expertise. On the other hand, it also raises the question as to whether a multitude of additional measures of AC expertise should be considered within future research.

Cluster 2: Agency theory and audit committee research [pre-SOX]

The second cluster lists 24 different documents. The principal-agent theory, as exemplified by the Jensen and Meckling (1976) and Fama and Jensen (1983) publications, assumes a profound position within the scientific discourse on the interactions of different actors involved in the corporate governance system. A predominance of the theory is strongly reflected within the co-citation network, given that the links that emanate from cluster number two permeate all of the remaining clusters. Fama and Jensen (1983) use the principal-agent theory and the findings of Jensen and Meckling (1976) to investigate the fundamental challenges of corporate governance while focusing on examining the indispensability of the board of directors for effective control and oversight mechanisms within a firm. The principal-agent theory's discernible impact on the co-citation network becomes apparent by the fact that most of the remaining clusters exhibit direct links (i.e., co-citations) to this (cluster) document. The principal-agent theory provides a theoretical approach to explain why ACs, as well as auditors, are critical pillars of good corporate governance. In the context of the separation of ownership and control (e.g., Fama & Jensen, 1983) and the existence of principal-agent relationships (e.g., Jensen, 1993; Jensen & Meckling, 1976), ACs are a valid mechanism to reduce information asymmetries, moral hazard, and other principal-agent risks. The most frequently cited documents with a similar thematical focus in this cluster are Fama and Jensen (1983) (34 links and 254 total link strength); Yermack (1996) (28;193); Jensen and Meckling (1976) (20;151); Jensen (1993) (15;111); and Klein (1998) (13;83).

Other distinct publications in this cluster deal with fraud, earnings manipulation, and determinants of AC member judgments. For example, Beasley (1996), as the study with the highest number of links (53) and total link strength (413), analyzes the board of director composition and

possible effects on financial statement fraud. As a central study, Dechow, Sloan, and Sweeney (1996) provide early empirical evidence on the importance of ACs in the context of earnings quality. The authors capture the internal governance structure (i.e., board size and structure, duality and founding role of Chief Executive Officer (CEO), AC and external blockholder existence, external audit firm) of a sample of 92 firms that are subject to SEC enforcement actions between 1982 and 1992. The study's results indicate that an absence of ACs positively affects the likelihood of earnings manipulation.

Table 2.4
Cluster 2: Frequently co-cited documents in AC-related articles

Article	Cluster	Links	Total link strength
Beasley (1996)	2	53	413
Dechow, Sloan, and Sweeney (1996)	2	46	339
Fama and Jensen (1983)	2	34	254
Yermack (1996)	2	28	193
Jensen and Meckling (1976)	2	20	151
Jensen (1993)	2	15	111
Klein (1998)	2	13	83
Kalbers and Fogarty (1993)	2	12	66
Weisbach (1988)	2	10	62
Fama (1980)	2	8	53
Lipton and Lorsch (1992)	2	7	37
Hermalin and Weisbach (2003)	2	6	32
SEC (2003b)	2	6	32
Levitt Jr. (1998)	2	6	33
Gilson (1990)	2	5	28
Warfield, Wild, and Wild (1995)	2	4	21
Palmrose, Richardson, and Scholz (2004)	2	3	16
DeZoort (1998)	2	2	11
Raghunandan, Rama, and Read (2001)	2	2	11
Shivdasani and Yermack (1999)	2	2	10
Beneish (1999)	2	2	10
Morck, Shleifer, and Vishny (1988)	2	2	11
Rosenstein and Wyatt (1990)	2	2	11
DeZoort (1997)	2	1	5

Note: Links indicate the number of existing co-citations of a document with other documents of the network. Total link strength indicates the total strength of the co-citations of a document with other network documents.

Furthermore, the studies of DeZoort (1998), who exploits an experimental setting in which the audit experience of AC members is found to affect AC members' judgments, as well as Raghunandan, Rama, and Read (2001), who scrutinize the effects of AC members' independence and financial experience on the interaction with internal auditing, provide additional evidence on the

relationship between AC characteristics internal governance quality. The former SEC chairman *Arthur Levitt Jr.*, in his critical discussion statement "The Numbers Game", outlines the challenges of risks for listed companies. Following the author's line of argumentation, it becomes clear that ACs' oversight process has to be improved. Thus, a central demand is to improve the financial reporting quality and the governance of the company as he states that "[...] qualified, committed, independent, and tough-minded audit committees represent the most reliable guardians of the public interest" (Levitt Jr., 1998, p. 14).

Cluster 3: Regulatory framework of AC research

The 14 publications included in cluster 3 are covering a broad range of studies on the recommendations of the "Blue Ribbon Committee" about the improvement of AC oversight over financial reporting and relevant research studies after the report in this area. The Blue Ribbon Committee (BRC) (1999) refers to a self-regulatory framework, consisting of ten different AC best practice-recommendations as well as four guiding principles, aiming to promote "[...] pragmatic, progressive changes in the functions and expectations placed on corporate boards, audit committees, senior and financial management, the internal auditor, and the outside auditors regarding financial reporting and the oversight process" (BRC, 1999, p. 1068). The report on enhanced ACE is simultaneously the most influential publication of this cluster (37 links and a total link strength of 283).

Table 2.5
Cluster 3: Frequently co-cited documents in AC-related articles

Article	Cluster	Links	Total link strength
BRC (1999)	3	37	283
Carcello and Neal (2000)	3	28	201
Beasley et al. (2000)	3	10	62
DeZoort and Salterio (2001)	3	10	57
McDaniel, Martin, and Maines (2002)	3	8	43
Beasley, Carcello, and Hermanson (1999)	3	7	44
Menon and Williams (2004)	3	6	33
Abbott et al. (2003)	3	5	26
Hermalin and Weisbach (1998)	3	3	17
Treadway Commission (1987)	3	3	15
Lee, Mande, and Ortman (2004)	3	3	15
Knapp (1987)	3	1	5
NACD (1999)	3	1	5
DeFond (1992)	3	1	5

Note: Links indicate the number of existing co-citations of a document with other documents of the network. Total link strength indicates the total strength of the co-citations of a document with other network documents.

Nevertheless, on the second rank, Carcello and Neal (2000) transfer the composition of ACs to effects on auditor reporting, yielding values of 28 (links) and 201 (link strength) in this cluster. More precisely, the study finds that firms with less independent audit committees (fewer outside directors as members) are associated with a lower likelihood of receiving a going concern opinion by external auditors. This avoidance of a going concern opinion is likely the result of pressure exerted by less independent audit committees on the external auditor. Further, based on the COSO Report of Beasley, Carcello, and Hermanson (1999) about fraudulent financial reporting, which was published in Accounting Horizons as Beasley et al. (2000), influencing factors on financial reporting quality and fraudulent financial reporting behavior are being discussed in this cluster.

The remaining publications in this cluster extend this discussion through research on the relationship of the AC, the external auditor, and financial reports. DeZoort and Salterio (2001) investigate the effects of governance experience and audit knowledge on AC members' judgments. Notwithstanding that cluster number one encompasses the majority of documents on the composition of ACs, the McDaniel, Martin, and Maines (2002) study, as part of cluster number three, focuses on the evaluation of financial reporting quality by financially experienced vis-$\grave{a}$-vis financially literate AC members as the essential part of their corporate oversight responsibilities. Finally, Menon and Williams (2004) scrutinize the role of former audit partners who join a firm's board of directors, reporting a positive effect of their presence on abnormal accruals.

Cluster 4: Transitional audit committee research [pre-/post-SOX]

Cluster number four, which includes a total of eleven publications, is dominated by the studies by *A. Klein* (Klein, 2002a, 2002b) that yield early evidence on the relevance of independence on the board and AC level as well as its positive influence on financial reporting quality. The Klein (2002b) study is the most frequently co-cited document within the network and is characterized by highly developed co-citation links to all major documents of the network.

Furthermore, Beasley and Salterio (2001) discuss the value of outside (independent) directors while focusing on subsequent audit committee staffing decisions. Other documents in this cluster concentrate on audit fees (Carcello et al., 2002), equity incentives of board members (Cheng & Warfield, 2005) or organizational complexity and corporate governance (e.g., Bushman et al., 2004). Given that seven cluster documents have been published shortly before or after the effective date of SOX, we posit that this cluster expresses a transformational process of the AC discussion, wherein audit committee research starts to emerge as an autonomous discipline within the scientific field of corporate governance.

Table 2.6
Cluster 4: Frequently co-cited documents in AC-related articles

Article	Cluster	Links	Total link strength
Klein (2002a)	4	54	452
Klein (2002b)	4	28	209
Core, Holthausen, and Larcker (1999)	4	11	65
Larcker, Richardson, and Tuna (2007)	4	8	52
Beasley and Salterio (2001)	4	7	40
Gompers, Ishii, and Metrick (2003)	4	4	23
Zmijewski (1984)	4	3	15
Carcello et al. (2002)	4	1	5
Cheng and Warfield (2005)	4	1	5
Bushman et al. (2004)	4	1	6
Ashbaugh-Skaife et al. (2008)	4	1	5

Note: Links indicate the number of existing co-citations of a document with other documents of the network. Total link strength indicates the total strength of the co-citations of a document with other network documents.

Cluster 5: External audit independence

The fifth cluster deals primarily with the topic of external auditor independence and ACs' interaction with external auditors. Accordingly, external audit fees and non-audit services, as well as their effects on the AC (and vice versa), are being discussed thoroughly by several authors in the cluster (e.g., Ashbaugh, LaFond, & Mayhew, 2003; DeFond, Raghunandan, & Subramanyam, 2002; Frankel, Johnson, & Nelson, 2002; Larcker & Richardson, 2004). The formation of this cluster further substantializes the intertwinement of research on external auditing and ACs. This view is corroborated by the fact that SOX (U.S. Congress, 2002) emerges as a central document in this area of the network, being a bridge between the fifth cluster and all remaining clusters of the co-citation network.

Additionally, cluster document Geiger and North (2006) provides evidence on the possible effects of hiring a new CFO on financial reporting quality. Three external audit-related studies (Lennox, 2005; Lennox & Park, 2007; Menon & Williams, 2004) analyze the effects of prior experience of board or audit committee members on the appointment of external audit firms, AC independence, or abnormal accruals. The research stream represented by these studies focuses on the revolving-door phenomenon, whereby former external audit partners or directors occupy a position on the board of a former client. Even though any additional experience in the area of auditing is found to be useful and helpful for AC members, adverse effects on audit quality or judgments of AC members are mentioned as a potential trade-off.

Table 2.7
Cluster 5: Frequently co-cited documents in AC-related articles

Article	Cluster	Links	Total link strength
U.S. Congress (2002)	5	30	224
Frankel, Johnson, and Nelson (2002)	5	10	54
Ashbaugh, LaFond, and Mayhew (2003)	5	3	15
Lennox and Park (2007)	5	3	15
Larcker and Richardson (2004)	5	2	12
SEC (2003c)	5	2	11
Menon and Williams (2004)	5	2	10
Simunic (1984)	5	1	5
Carcello et al. (2002)	5	1	5
DeFond, Raghunandan, and Subramanyam (2002)	5	1	5
Geiger and North (2006)	5	1	5
Lennox (2005)	5	1	5

Note: Links indicate the number of existing co-citations of a document with other documents of the network. Total link strength indicates the total strength of the co-citations of a document with other network documents.

2.4.3 Supplemental analysis

Acknowledging the ubiquitousness of SOX within AC research, we conduct an additional co-citation analysis to organize the examined scientific output chronologically. For this purpose, we create two separate networks that capture research concepts in periods before (1977 - 2002) and after SOX (2003 - 2018). The construction of the pre-SOX network (16 articles) and post-SOX network (76 articles) follows closely the methodological steps described earlier. Figure 2.4 exhibits the results of the supplemental bibliometric analysis.

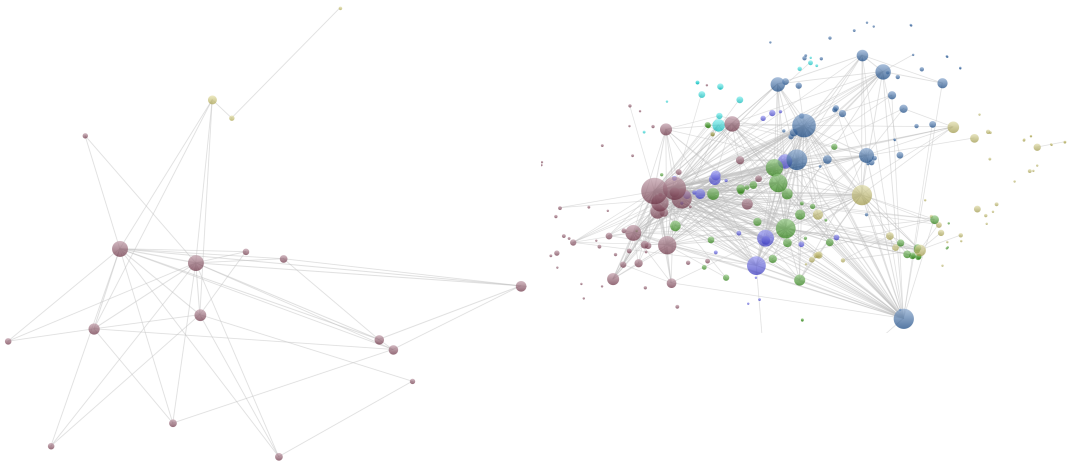
The pre-SOX network is, with few exceptions, a mere reflection of the debate on agency theory and includes 19 different frequently co-cited documents. The four cornerstones of the network are the Fama and Jensen (1983), Fama (1980), and Jensen and Meckling (1976) as well as Jensen (1993) studies. Further, the Blue Ribbon Committee (BRC) (1999) report, as a starting point of the ACE discussion, is included in this cluster. Interestingly, several of the remaining network studies (e.g., Beasley, 1996; Beasley, Carcello, & Hermanson, 1999) investigate the oversight phenomenon on the level of the board of directors without mentioning the role of ACs. This indicates that the pre-SOX concepts on effective firm monitoring are mostly limited to the role of the board of directors and theoretically embedded within agency-theory.

In contrast, the post-SOX network is characterized by a wide variety of co-cited documents and clusters.[10] However, despite the exclusion of pre-SOX AC research, most of the more contemporary co-citation clusters are deeply rooted in a distinct cluster, which essentially resembles the

[10] Overall, the post-SOX network is comparable to the initial network presented in Figure 2.3.

Figure 2.4
Pre- versus post-SOX co-citation network of AC-related studies published in the leading accounting journals

(a) Pre-SOX network (1977 - 2002) **(b)** Post-SOX network (2003 - 2018)



Note: The nodes represent highly co-cited documents within audit committee-related articles. A thicker node equals a higher number of co-citations with other items of the network. Links (illustrated as lines) between nodes indicate the number of co-citations of two documents. A thicker link indicates a higher co-citation frequency.

pre-SOX network (red coloration). Since the theoretical basis of the agency theory is, as a consequence, a dominant theoretical underpinning of studies in the post-SOX period, the corresponding theoretical sources occur frequently in their list of references. This is noteworthy given that many authors in the field have called for alternative approaches to explain the value of ACs. This notion is corroborated by the remarks of DeFond and Francis (2005), who note that the "[...] absence of theoretical guidance presents obvious problems in investigating questions about audit committees' effectiveness" (DeFond & Francis, 2005, p. 17). As a rare exception, Dhaliwal, Naiker, and Navissi (2010) propose the resource dependency theory as suitable to explain the value of board directors with regards to firms' strategic decision making. Also, a few qualitative studies go beyond the theoretical status quo as they introduce a multitude of theories to explain the nature of ACs as an oversight mechanism (e.g., Beasley et al., 2009; Cohen, Krishnamoorthy, & Wright, 2002; Gendron & Bédard, 2006).

2.5 Discussion and conclusion

The results of the bibliometric analysis reveal a new perspective on AC research in the broader realms of corporate governance and accounting research. Within the latter, as well as in other scientific disciplines (e.g., management research), studies on the AC constitute a central research

strand. Consequently, the objective of this study was to present a structured investigation of the AC research landscape by means of citation, co-citation, and social network analysis. Studying the underlying citation patterns of AC publications in the leading accounting journals allows for several inferences. First, visualizing the five central co-citation network clusters brings forth the notion of a profound dominance of archival studies on AC characteristics and their effects on different (financial) output variables in the post-SOX era. This rather trivial observation is contrasted by the highly inconsistent application of concepts that measure audit committee effectiveness. The most frequently co-cited studies in the post-SOX era consequently yield mixed results and present no overarching combination of AC characteristics to explain audit committee effectiveness.

Moreover, the dominance of archival AC research with a simultaneously strong focus on U.S. data underlines the homogeneity of the existing research approaches. Despite the infrequent integration of additional variables (e.g., AC member directorships, AC member tenure, or stock ownership) or new empirical methods, the current state of the art research continues to focus on the known input-output relationship. Relevant dimensions suggested by DeZoort et al. (2002), such as AC authority or diligence, often fall short or lack versatility in this context.

Furthermore, the existing qualitative research approaches integrate the process perspective to generate insights into AC practices, which is absent in more recent archival studies. Thus, we think incorporating additional process measures might be a promising avenue for future quantitative studies.

Additionally, the existing focus on U.S. data impedes a better understanding of the oversight process of ACs in general. Since prior research was mainly conducted after SOX, the tasks of SOX-regulated ACs might only capture a narrow perspective of day-to-day AC practices around the world. Thus, a multinational approach might be helpful to better explain the essential ramifications of AC oversight on financial reporting quality. This might include a comparison of North American ACs and ACs operating in alternative oversight systems, such as the European two-tier board system. Mixed method studies, as well as more experimental research, would further help to improve the existing knowledge and perspectives on AC practices. In addition, the sources cited as well as the underlying AC research studies considered exhibit a striking dominance of archival research approaches.

Second, the five network clusters reflect the predominance of the principal agent-theory that is frequently used as the theoretical underpinning within current AC studies. However, particularly in corporate governance research, the behavioral aspects of board oversight are often subsumed under the term "board dynamics" (e.g., Ingley & Van Der Walt, 2002). The board dynamic discussion started in the 1960s, when researchers recognized that only few data and facts were available about the working methods of boards and that corporate governance research had to deal with this topic. This demand was not addressed by empirical corporate governance and AC research for a long time, because boards are difficult to access for external researchers due to their con-

fidentiality obligation. Interestingly, the demand can also be justified by the extensive failure of traditional empirical agency research, which could not prove consistent connections between governance structures and corporate success. Most process models have in common that processes are conceptually integrated as intermediate variables between board structure and corporate success (e.g., Bhagat & Bolton, 2008). The process variable is conceptualized in such a way that boards are interpreted as social groups whose decisions depend on and are influenced by the cooperative behavior of the group members. The input-process output approach is based on principal agent research by hypothesizing a direct relationship between structural features of boards (input) and performance (output). Known structural features such as the size of the board, the independence of the board members, the existence of committees, the qualifications of the members of the board and the compensation of the board members are discussed as structural dimensions.

In contrast to principal agent research, a processual model assumes that the direct relationship between structural dimensions and performance is mediated by the process, i.e., that good processes are necessary and that the failure of processes cannot be compensated by a structural solution. Examples like Enron, WorldCom, Tyco, and others might have had solid structures, but often failed because of the misconduct of board members, a lack of AC oversight or the indirect acceptance of fraudulent financial reporting processes by external auditors (e.g., Benston & Hartgraves, 2002). Therefore, future research should consider behavioral aspects of ACs to extend the current homogeneous view. ACs can be understood as a social group whose performance is measured not only by the extent to which they fulfill their oversight and control tasks, but also to which extent they cooperate. An important prerequisite for a constructive cooperation is, e.g., the unimpeded exchange of information between the board members and the AC members.

Furthermore, in order to be able to perform the priorly described AC roles, AC members must possess certain characteristics and skills and especially the intellectual capital. The intellectual resources cover knowledge, information, experience, relationships, routines, and other procedures. Thus, it is of special interest to include more intellectual factors in the AC research discussion.

Today's management is characterized by terms such as Big Data and digitalization or the automation of internal processes and inherent internal controls. The global and complex activities of companies also create new risks. For this reason, it is particularly important for ACs to deal with the challenges of the current corporate environment in order to ensure the best possible monitoring. If the presented trends are relevant in practice, research should, of course, also cover these areas. Furthermore, it should also be questioned to what extent the current predominant orientation of AC research and regulatory requirements, such as SOX or Blue Ribbon, is still up-to-date or should be expanded.

However, the interpretation of the bibliometric results is subject to several caveats. Our focus on studies published in the top six journals in the area of accounting is limited to the perspective of well-established accounting journals without including other leading general-interest publication

outlets. However, journals with a stronger focus on practice potentially open other perspectives of AC oversight and could be used in future studies. Accordingly, although the composition of the identified clusters is based on the co-citation analysis of all considered sources, there remains a subjectivity in the analysis and evaluation of the cluster-specific content (albeit having been conducted with the highest possible degree of scientific care).

Nevertheless, the bibliometric analysis of the existing AC research reveals an exciting picture regarding the existing research streams and topics. Our study contributes to the current AC discussion since we are able to offer new insights and perspectives based on empirical results from our bibliometric analysis.

Appendix

2.A Distribution of AC-related publications

Table 2.A.1
Distribution of AC-related publications in the leading accounting journals

Year	AOS	CAR	JAE	JAR	RAST	TAR	Total
1977	1	0	0	0	0	0	1
1981	0	0	1	0	0	0	1
1987	0	0	0	0	0	1	1
1991	0	1	0	0	0	0	1
1992	1	0	0	0	0	0	1
1996	0	1	0	0	0	1	2
1998	1	0	0	0	0	0	1
2000	0	0	0	0	0	1	1
2001	0	1	0	0	0	0	1
2002	0	2	1	0	0	3	6
2003	0	1	0	0	0	2	3
2004	0	0	1	0	0	1	2
2005	0	1	0	5	0	2	8
2006	1	0	0	0	0	1	2
2007	0	2	0	0	0	1	3
2008	1	2	0	1	0	1	5
2009	1	3	0	0	0	4	8
2010	1	1	2	0	0	1	5
2011	1	1	0	0	0	2	4
2012	0	0	0	0	0	1	1
2013	1	0	0	0	1	5	7
2014	0	0	2	0	1	3	6
2015	4	1	0	0	1	2	8
2016	1	2	0	0	0	1	4
2017	0	3	0	0	1	3	7
2018	0	2	0	0	0	1	3
Total	14	24	7	6	4	37	92

Note: AOS = Accounting, Organizations and Society, CAR = Contemporary Accounting Research, JAE = Journal of Accounting and Economics, JAR = Journal of Accounting Research, RAST = Review of Accounting Studies, TAR = The Accounting Review.

2.B Cluster 1: Summary of AC-related studies

Table 2.B.1
Cluster 1: Summary of studies

Article		Sample	AC Categories	Topic	AC-related Results
DeFond, Hann, and Hu (2005)	[A]	813 (702) outside director appointments for 594 (509) firms	*AE; FE; Ind.; Size*	Cumulative abnormal returns	Positive market reaction to the appointment of accounting financial experts to the audit committee but not around the appointment of nonaccounting financial experts or directors without financial expertise. Only valid when the appointing firms have strong corporate governance before appointing the new directors.
Bédard, Chtourou, and Courteau (2004)	[A]	Matched pair of 100 firms with high and low levels of earnings management	*Aut.; Dil.; FE; GE; Ind.*	FRQ	(Percentage of short-term stock incentives held by nonrelated outside members) Presence of a financial expert in the audit committee, a committee composed solely of nonrelated directors, number of directorships held by nonrelated outside members in unaffiliated firms and a clear mandate to oversee the financial reporting processes and the audit are (positively) negatively related with the likelihood of aggressive earnings management.
Abbott, Parker, and Peters (2004)	[A]	88 restating firms	*Dil.; FE; Ind.; Size*	FRQ	ACs consisting of entirely independent members, their meeting frequency as well as the presence of at least one member with financial expertise are negatively associated with the likelihood of financial restatement.
Carcello and Neal (2000)	[A]	250 publicly traded firms with a clean audit opinion versus 124 firms with a Going-Concern (GC) Opinion	*Dil.*; FE; GE; Ind.*	Auditor dismissal	Positive (negative) relationship between proportion of affiliated AC directors as well as AC stock ownership (average number of directorships in other public companies held) and auditor dismissal after first GC report.
Agrawal and Chadha (2005)	[A]	59 U.S. earnings restating public companies (industry-size matched control sample)	*Dil.*; FE; Ind.; Size*	FRQ	Only the presence of an independent financial expert on the AC is found to be negatively related to the probability of restating reported earnings.

Note: **Method:** [A] = Archival, [I] = Interview study, [R] = Literature review, [S] = Survey study. **AC Categories:** *AE* = Accounting expert (additional consideration of an accounting expert on the AC), *Bus.* = Focus on additional characteristics of AC member busyness (e.g., number of directorships or committee memberships held), *Dil.* = Diligence (e.g., meeting frequency, stock ownership [marked with a * if meeting frequency not considered]), *FE* = Financial expertise (includes accounting expertise in some studies), *GE* = Governance experience (AC members hold additional directorships in other firms), *Ind.* = Independence (e.g., one or all AC members are outside directors), *SE* = Supervisory expertise (i.e., prior supervision of employees with financial reporting responsibilities), *Ten.* = AC member tenure, *TO* = AC member turnover.

Cluster 1: Summary of studies (continued)

Article		Sample	AC Categories	Topic	AC-related Results
Krishnan (2005)	[A]	128 publicly listed companies with disclosed internal control problems (industry and exchange affiliation matched control sample)	*AE; Dil.; FE; GE; Ind.; Size*	ICFR	Proportion of independent outsiders and proportion of financial experts on the AC are negatively associated with a Form 8-K disclosure of internal control problems.
Srinivasan (2005)	[A]	409 earnings restating companies	*Board level only*	AC member departure	The likelihood of audit committee members leaving is increasing in the severity of the restatement. In case of severe restatements, likelihood of departure is higher for audit committee directors with a direct responsibility for overseeing the financial reporting process. The loss in other directorships, given an increase in the intensity of the restatement, is more pronounced for audit committee directors vis-à-vis non-audit committee directors.
Farber (2005)	[A]	87 firms subject to SEC enforcement actions (industry-matched control sample)	*Dil.; FE; Ind.; Size*	Fraud	Fraud firms are found to possess comparatively lower proportions of financial experts on the AC and meet less frequently than their non-fraud peers. The latter shortcoming is reverted in the years following fraud detection. No difference regarding AC independence is found.
Beasley (1996)	[I]	42 AC members	*Aut.; Dil.; FE; Ind.*	AC Oversight	Rely on a qualitative approach to investigate the extent of ceremonial versus substantial oversight procedures of AC members as well as their central underlying behavioral processes. While the final analysis reveals considerable variation in AC oversight practices, a consistent observation presented is that most ACs have shifted their focus towards financial expertise in the post-SOX era.

Note: **Method:** [A] = Archival, [I] = Interview study, [R] = Literature review, [S] = Survey study. **AC Categories:** *AE* = Accounting expert (additional consideration of an accounting expert on the AC), *Bus.* = Focus on additional characteristics of AC member busyness (e.g., number of directorships or committee memberships held), *Dil.* = Diligence (e.g., meeting frequency, stock ownership [marked with a * if meeting frequency not considered]), *FE* = Financial expertise (includes accounting expertise in some studies), *GE* = Governance experience (AC members hold additional directorships in other firms), *Ind.* = Independence (e.g., one or all AC members are outside directors), *SE* = Supervisory expertise (i.e., prior supervision of employees with financial reporting responsibilities), *Ten.* = AC member tenure, *TO* = AC member turnover.

Cluster 1: Summary of studies (continued)

Article		Sample	AC Categories	Topic	AC-related Results
Krishnan and Visvanathan (2008)	[A]	633 S&P 500 firms	*AE; Dil.; FE; Ind.; Size*	FRQ	AC (accounting-related) financial expertise is positively associated with different measures of accounting conservatism. Effective monitoring and promotion of conservative accounting of AC financial experts are both predicated upon high-quality governance on the board level. No direct effects observed for the remaining AC categories.
Xie, Davidson, and DaDalt (2003)	[A]	110 S&P 500 firms	*Dil.; FE; Ind.; Size*	FRQ	More frequent AC meetings, the proportion of outside directors, and the presence of outside directors from investment banks are associated with reduced levels of earnings management.
DeZoort et al. (2002)	[R]	49 AC publications	*See results*	ACE	Summarizes scientific publications on AC composition, authority, resources, and diligence.
Anderson, Mansi, and Reeb (2004)	[A]	252 S&P 500 firms	*Dil.; FE; Ind.; Size*	Debt financing	AC independence, size, and the frequency of AC meetings are found to negatively affect debt financing costs. In general, board and AC monitoring substantially influence cost of debt.
McMullen and Raghunandan (1996)	[S]	51 firms (with control sample of 77 firms) that are subject to SEC enforcement actions and or earnings restatements	*Dil.; FE; Ind.*	FRQ	Firms with financial reporting problems exhibit relatively poor ACE (less likely to consist solely of outside directors or to have a CPA as a member, meet less frequent).
Dhaliwal, Naiker, and Navissi (2010)	[A]	770 firms in the post-SOX era	*AE; Bus.; Dil.; FE; Ind.; SE; Size; Ten.*	FRQ	AC accounting experts are associated with superior financial reporting quality. Moreover, AC members with accounting expertise who are independent and exhibit comparatively lower levels of held directorships and tenure in their firms positively affect the quality of accruals.

Note: **Method:** [A] = Archival, [I] = Interview study, [R] = Literature review, [S] = Survey study. **AC Categories:** *AE* = Accounting expert (additional consideration of an accounting expert on the AC), *Bus.* = Focus on additional characteristics of AC member busyness (e.g., number of directorships or committee memberships held), *Dil.* = Diligence (e.g., meeting frequency, stock ownership [marked with a * if meeting frequency not considered]), *FE* = Financial expertise (includes accounting expertise in some studies), *GE* = Governance experience (AC members hold additional directorships in other firms), *Ind.* = Independence (e.g., one or all AC members are outside directors), *SE* = Supervisory expertise (i.e., prior supervision of employees with financial reporting responsibilities), *Ten.* = AC member tenure, *TO* = AC member turnover.

Cluster 1: Summary of studies (continued)

Article		Sample	AC Categories	Topic	AC-related Results
Zhang, Zhou, and Zhou (2007)	[A]	208 firms (and 208 industry- and sales-matched control firms) with SOX 302 or SOX 404 internal control problems	*AE; Dil.; FE; Ind.; Size*	ICFR	ACs with less financial expertise (less accounting financial expertise and non-accounting financial expertise) are positively associated with the disclosure of internal control weaknesses.
DeFond and Francis (2005)	[R]	-	*Dil.; FE; Ind.; Size*	ACE in the post-SOX era	Provides a thorough discussion on the constituting pillars (i.e., independence, financial expertise, diligence) of ACE and their relevance within the corporate governance framework.
Vafeas (2005)	[A]	252 Fortune 500 firms	*Bus.; Dil; FE; GE; Ind.; Size; Ten.*	FRQ	Increase of independence and experience of ACs between 1994 and 2000. Less independent ACs (proportion of insiders) as well as ACs with business executives negatively affect reported earnings quality, whereas more frequent meetings and increases in stock ownership of AC members positively affect earnings quality.
Hoitash and Bédard (2009)	[A]	5,480 firm-year observations (3,911 accelerated and 1,569 non-accelerated filers)	*AE; Dil.; FE; SE; Size*	ICFR	AC accounting experts are associated with enhanced controls over processes directly related to the financial reports, while supervisory experts are associated with enhanced controls over management processes. Both the number of AC meetings and financial experts positively influence disclosures of Section 404 and 302 material weaknesses.
Cohen, Krishnamoorthy, and Wright (2010)	[I]	30 interviews with audit partners and managers from three different Big 4 firms	*Aut.; Dil.; FE*	AC Oversight	Documents a change in AC oversight procedures and especially interactions with internal and external auditors in the post-SOX area. Interviewed parties further note that, as a reaction to SOX, many ACs take substantive actions to address emerging issues whenever brought to their attention by external auditors.

Note: **Method:** [A] = Archival, [I] = Interview study, [R] = Literature review, [S] = Survey study. **AC Categories:** *AE* = Accounting expert (additional consideration of an accounting expert on the AC), *Bus.* = Focus on additional characteristics of AC member busyness (e.g., number of directorships or committee memberships held), *Dil.* = Diligence (e.g., meeting frequency, stock ownership [marked with a * if meeting frequency not considered]), *FE* = Financial expertise (includes accounting expertise in some studies), *GE* = Governance experience (AC members hold additional directorships in other firms), *Ind.* = Independence (e.g., one or all AC members are outside directors), *SE* = Supervisory expertise (i.e., prior supervision of employees with financial reporting responsibilities), *Ten.* = AC member tenure, *TO* = AC member turnover.

Cluster 1: Summary of studies (continued)

Article		Sample	AC Categories	Topic	AC-related Results
Doyle, Ge, and McVay (2007a)	[A]	779 firms that disclosed a Section 302 or 404 material weakness (5,047 control firms)	*Ind. as part of a composite score*	ICFR	Inconsistent relationship with different types of internal control material weakness disclosures.
Carcello et al. (2006)	[A]	350 non-financial publicly traded [NYSE, Nasdaq's National Market (NNM), Nasdaq's Small Cap Market (SCM)] firms	*AE; Ind.; FE; Size*	FRQ	Presence of an accounting expert on the AC negatively influences earnings management (accounting accruals) given that overall corporate governance is weak. Furthermore, independence of the accounting experts promotes effective governance compared to non-independent accounting experts. These findings are offset by the existence of an overall stronger corporate governance environment (including AC size and independence). Finally, having an accounting expert on the AC positively affects reported discretionary expenditures.
Cohen, Krishnamoorthy, and Wright (2004)	[R]	Synthesize scientific insights on the relationship between corporate governance and financial reporting quality	*Aut.; Composition; FE; Ind.*	ACE	Emphasize the relevance of the governance context (i.e., board support and empowerment) as an additional factor of ACE that complements independence and financial expertise.
Linck, Netter, and Yang (2009)	[A]	8,417 publicly traded firms as well as 2,209 S&P 1500 firms	*Dil.; TO*	Governance	Conclude that as a consequence of SOX, ACs have doubled their meeting frequency and receive additional remuneration for their services. Also, an increase in AC member turnover is reported in the post-SOX era.
Gendron and Bédard (2006)	[I]	25 interviews with members of three large Canadian public corporations	*See results*	ACE	Highlight AC members' practice of "constructing meanings of effectiveness" especially during formal and informal meetings. Conclude that the participants' sense of ACE is derived from a subset of reflective actions, such as asking critical questions and engaging in informal discussions before meetings, that often elude generalizable and objective measurement by researchers.

Note: **Method:** [A] = Archival, [I] = Interview study, [R] = Literature review, [S] = Survey study. **AC Categories:** *AE* = Accounting expert (additional consideration of an accounting expert on the AC), *Bus.* = Focus on additional characteristics of AC member busyness (e.g., number of directorships or committee memberships held), *Dil.* = Diligence (e.g., meeting frequency, stock ownership [marked with a * if meeting frequency not considered]), *FE* = Financial expertise (includes accounting expertise in some studies), *GE* = Governance experience (AC members hold additional directorships in other firms), *Ind.* = Independence (e.g., one or all AC members are outside directors), *SE* = Supervisory expertise (i.e., prior supervision of employees with financial reporting responsibilities), *Ten.* = AC member tenure, *TO* = AC member turnover.

2.C List of AC-related publications (1977 – 2018)

Table 2.C.1
List of AC-related publications in the leading accounting journals

Pre-SOX (1977-2002)		**Post-SOX (2003-2010)**		**Post-SOX (2011-2018)**	
Author(s)	Journal	Author(s)	Journal	Author(s)	Journal
San Miguel, Shank, and Govindarajan (1977)	AOS	Carcello and Neal (2003)	TAR	Agoglia, Doupnik, and Tsakumis (2011)	TAR
DeAngelo (1981b)	JAE	Ng and Tan (2003)	TAR	Krishnan, Wen, and Zhao (2011)	TAR
Knapp (1987)	TAR	Abbott et al. (2003)	CAR	Norman, Rose, and Suh (2011)	AOS
Wallace and Kreutzfeldt (1991)	CAR	Kornish and Levine (2004)	TAR	Carcello et al. (2011)	CAR
Johnson (1992)	AOS	Anderson, Mansi, and Reeb (2004)	JAE	Keune and Johnstone (2012)	TAR
Beasley (1996)	TAR	Farber (2005)	TAR	Chen and Li (2013)	TAR
Dechow, Sloan, and Sweeney (1996)	CAR	Krishnan (2005)	TAR	Chen, Martin, and Wang (2013)	TAR
DeZoort (1998)	AOS	DeFond, Hann, and Hu (2005)	JAR	Chiu, Teoh, and Tian (2013)	TAR
Carcello and Neal (2000)	TAR	Engel (2005)	JAR	Erkens and Bonner (2013)	TAR
Beasley and Salterio (2001)	CAR	Karamanou and Vafeas (2005)	JAR	Naiker, Sharma, and Sharma (2013)	TAR
Klein (2002a)	JAE	Richardson (2005)	JAR	Wainberg et al. (2013)	AOS
McDaniel, Martin, and Maines (2002)	TAR	Srinivasan (2005)	JAR	Bryan et al. (2013)	RAST
Peecher (2002)	TAR	Vafeas (2005)	CAR	Beck and Mauldin (2014)	TAR
Klein (2002b)	TAR	Gaynor, McDaniel, and Neal (2006)	TAR	Bruynseels and Cardinaels (2014)	TAR
Carcello et al. (2002)	CAR	Gendron and Bédard (2006)	AOS	Cohen et al. (2014)	TAR
Cohen, Krishnamoorthy, and Wright (2002)	CAR	Abbott et al. (2007)	TAR	Badolato, Donelson, and Ege (2014)	JAE
		Chen and Zhou (2007)	CAR	Hayes (2014)	JAE
		Lennox and Park (2007)	CAR	Baber, Krishnan, and Zhang (2014)	RAST
		Venkataraman, Weber, and Willenborg (2008)	TAR	Ege (2015)	TAR
		Dey (2008)	JAR	Harris, Petrovits, and Yetman (2015)	TAR
		Thornburg and Roberts (2008)	AOS	Christ et al. (2015)	AOS
		Archambeault, DeZoort, and Hermanson (2008)	CAR	Ju, Trotman, and Trotman (2015)	AOS
		Krishnan and Visvanathan (2008)	CAR	Trotman, Bauer, and Humphreys (2015)	AOS
		Hoitash and Bédard (2009)	TAR	Vera-Muñoz (2015)	AOS
		Laux and Laux (2009)	TAR	Cheng, Huang, and Li (2015)	CAR
		Magilke, Mayhew, and Pike (2009)	TAR	Chen, Cheng, and Wang (2015)	RAST
		Naiker and Sharma (2009)	TAR	Bills, Cunningham, and Myers (2016)	TAR
		Botzem and Quack (2009)	AOS	Backof, Bamber, and Carpenter (2016)	AOS
		Beasley et al. (2009)	CAR	Kachelmeier, Rasmussen, and Schmidt (2016)	CAR
		Gendron (2009)	CAR	Lisic et al. (2016)	CAR
		Goh (2009)	CAR	Bills, Lisic, and Seidel (2017)	TAR
		Caskey, Nagar, and Petacchi (2010)	TAR	He et al. (2017)	TAR
		Engel, Hayes, and Wang (2010)	JAE	Kim and Klein (2017)	TAR
		Wysocki (2010)	JAE	Cohen, Krishnamoorthy, and Wright (2017)	CAR
		Norman, Rose, and Rose (2010)	AOS	Lai et al. (2017)	CAR
		Dhaliwal, Naiker, and Navissi (2010)	CAR	Li and Wahid (2018)	CAR
				Jiang and Zhou (2017)	RAST
				Kroos, Schabus, and Verbeeten (2018)	TAR
				Duellman et al. (2018)	CAR
				Johed and Catasús (2018)	CAR

Note: AOS = Accounting, Organizations and Society, CAR = Contemporary Accounting Research, JAE = Journal of Accounting and Economics,
JAR = Journal of Accounting Research, RAST = Review of Accounting Studies, TAR = The Accounting Review.

Chapter 3

The evolution of internal audit research: A bibliometric analysis of published documents (1926 – 2016)

3.1 Introduction

Throughout its historical development, the internal audit profession has established itself as a prerequisite of effective governance by providing oversight and assurance to management. During the early stages of the twentieth century, internal auditing became a reliable means of assuring employees' compliance with company policies and procedures. It also facilitated evaluations of the efficiency of complex and dispersed business operations that were beyond management's direct control. Internal auditors first assumed this critical role in the railway, defense, and retail industries and were quick to expand their scope from mere asset protection to financial transaction verification and audits at the management level (Ramamoorti, 2003). This realignment was followed by a shift from a financial appraisal function towards operational audit activities and included the monitoring of all sections of the firm. The establishment of the Institute of Internal Auditors (IIA) in 1941 further accelerated this development of the profession with the promulgation of internal audit standards, a code of ethics and the approval of a "common body of specialized knowledge" in 1972.

A stronger focus on added value was emphasized in 1999 when the IIA defined internal auditing as an "independent, objective assurance and consulting activity designed to add value and improve an organization's operations" (IIA, 1999). Firms were subsequently encouraged to allocate resources of the internal audit function (IAF) to the evaluation and improvement of risk management, control, and governance processes. The importance and legitimacy of the function flourished most notably in the aftermath of several post-millennial S&P 500 firm collapses and regulatory changes such as the Sarbanes-Oxley Act (SOX) of 2002, revised auditing standards by the PCAOB, and expanded NYSE provisions (e.g., Carcello, Hermanson, & Raghunandan, 2005a; Peterbridge & Messier, 2016). Internal auditing consequently assumed an integral role in the risk management and governance framework of organizations.

However, this progression declined after the recent financial crisis which raised concerns as to the role and impact of internal auditors. Calling into question the premise of added value, academics, practitioners and the broader public have engaged in a critical discussion that centers around the purpose of internal auditing and the methods used to assess its effectiveness (e.g., KPMG, 2009; Lapelosa, 2004; Sarens, 2014). How this development, which implies a substantial metamorphosis of internal auditing over time, has affected the course of internal audit research remains difficult to comprehend.

The scientific perspective on this topic, as epitomized by the existing body of literature, has been documented within different review studies. Gramling et al. (2004) consider the IAF as a resource to other parties of the governance framework (i.e., executive management, audit committees, and external auditors) and emphasize the co-ordination between external and internal auditors. The latter concept re-emerges in Bame-Aldred et al. (2013), who employ a literature-

based framework to capture factors that influence external auditors' decisions to rely on the IAF during financial statement audits. Chalmers, Hay, and Khlif (2018), in a review study on internal control literature, find internal auditing to be an important element of an organization's internal control environment and conclude that qualified internal auditors are instrumental in affecting internal control quality. Lenz and Hahn (2015), alternatively, consider the effectiveness of internal auditors in a practice-oriented literature study which reflects the perspectives of both internal audit practitioners and their respective stakeholders. Finally, Stewart and Subramaniam (2010) scrutinize internal auditor objectivity and independence in their analysis of 45 different articles on internal audit structures and activities.[1]

Since each of these qualitative studies reviews a relatively narrow strand of publications, insights are incoherent and yield no broader understanding of internal auditing within research. Adding to this condition is a lack of overview studies that offer a more aggregated and contextualized view to support a much-needed discussion of the profession's central issues (e.g., Lenz & Sarens, 2012). The present work therefore contributes to the literature by offering a holistic overview on relevant internal audit research topics based on citation patterns from articles published in leading accounting journals.

Focusing on scientific journals follows the notion that research on the IAF is represented in both generalist and specialist journals. While the former are commonly concerned with issues in the area of auditing, generalist journals tend to feature a broader stream of accounting-related topics such as tax, financial and managerial accounting, auditing, and governance. However, there is a notable difference in how each journal type influences the academic community. Prior research provides compelling evidence that generalist accounting journals are rated as qualitatively superior by academics compared to their specialist counterparts (Ballas & Theoharakis, 2003; Bonner et al., 2006; Brinn, Jones, & Pendlebury, 1996; Brown, 1996; Brown & Huefner, 1994; Jolly, Schroeder, & Spear, 1995; Lowe & Locke, 2005; Smith, 1994). Moreover, they also receive higher recognition via frequent citations (Chan & Liano, 2009; Rosenstreich & Wooliscroft, 2009; Wakefield, 2008) and accounting faculty members favor them as an outlet for their high-quality research as their careers often depend upon publishing in a top-tier journal (Bonner et al., 2006). Also, there is no consensus as to the relevance of some of the specialist audit journals (McKee, 2010) whereas leading accounting journals are known for publishing a constant proportion of high-quality audit research (e.g., Bonner et al., 2006, p. 679). Taken together, this implies an ability of generalist accounting journals to determine the research meta within their covered subfields (e.g., auditing and internal auditing). Recent studies further conclude that five accounting journals consistently

[1] Worth mentioning is also a broader stream of studies connected to the survey-based Common Body of Knowledge (CBOK) on the current status and perception of internal auditing on different continents (e.g., Hass, Abdolmohammadi, & Burnaby, 2006).

stand out as highly influential (see Bonner et al., 2006). This study accordingly focuses on these five leading accounting journals.[2]

As a consequence of the journal selection, the reported results of the citation analysis represent the content of internal audit publications within the boundaries of accounting research. That is, how internal auditing maps into research on the production of accounting information that stands in direct interrelation with economic events. Despite the clarity on the status of external auditors who "[...] sit between the accounting information produced by the firm and capital markets" (Oler, Oler, & Skousen, 2010, p. 664), a far less definite understanding exists of the interplay between internal auditing and the construction, dissemination, and reception of financial reporting information or its value to capital markets. This study consequently considers the kind of time-proven research which is deemed important through the lens of the accounting community. Not only does this illustrate what defines internal audit research with regards to quality and impact but helps foster a deeper understanding of the research domain for scholars seeking to familiarize themselves with the topic in the realm of accounting research. We are also able to draw implications in the form of potential avenues of future research.

The basic structure of this study is organized as follows. In the next section, both the chosen research approach and data selection process are described. The following section covers the descriptive results on the frequency of internal audit publications and developments of the research community. We then present our results of the co-citation and network analysis and discuss a variety of findings regarding the current status of internal audit research. A brief introduction of several potential areas of future research that emerge from the analysis follows. Finally, we discuss the major conclusions of our study and infer central implications.

3.2 Methodology

3.2.1 Co-citation and network analysis

The current study uses bibliometric network analysis to investigate the relevance of internal auditing within accounting research. Bibliometric analysis describes the investigation of an amount of published research, that is, of a branch of science or a country of interest, on both a quantitative and qualitative level (Steven, 1983). It is thought to chronologically map the evolution and core areas of a specific research field by processing patterns within published documents (Pritchard & Wittig, 1981; Raisig, 1962; White & McCain, 1989). This approach follows the concept of meta-knowledge, which encourages analytical pattern analysis of disseminated knowledge to highlight

[2] Namely *Accounting, Organizations and Society* (AOS), *Contemporary Accounting Research* (CAR), *Journal of Accounting and Economics* (JAE), *Journal of Accounting Research* (JAR) and *The Accounting Review* (TAR).

regularities in scientific claims (Evans & Foster, 2011).

Co-citation analysis, which represents a quantitative bibliometric technique, categorizes articles, books or comparable written scientific communication based on matching sources that occur in the reference list of a publication (e.g., Small, 1973). This co-occurrence of two or more indexed references defines the strength of content-related similarity between publications (i.e., more often referenced sources that frequently co-occur in publications signalize corresponding concepts and research themes). As seen in prior studies (e.g., Culnan, 1986; Hansen & Vogel, 2010; Lohmann & Eulerich, 2017; Servantie et al., 2016; White & McCain, 1998), mapping these citation-patterns allows for visualization of emerging research paradigms within the discipline of interest and to illustrate the "specialty structure of science" (Sullivan, White, & Barboni, 1977). The latter denotes the formal communication and perception of scientists within the network (Small & Griffith, 1974). Pilkington and Meredith (2009), for example, apply co-citation analysis to identify several formative groups of knowledge in the area of operations management between 1980 and 2006 and notice a shift in popularity of intermittently dominant knowledge groups.

From a methodological viewpoint, co-citation analysis yields the advantage of an objective intra-community evaluation tool as citations traditionally represent the recognition of individual contributions by the scientific community, casually paraphrased as "the field's view" (White & Griffith, 1981). External and often reputation based expert opinions, therefore, become redundant.[3]

To ensure meaningful and informative inferences related to our data, we use co-citation analysis in combination with network analysis as a method to visualize the structure of the citation data. In a first step, we thus constructed a symmetric co-citation matrix with $n \times n$ dimensions which documented the number c_{ij} that one of the listed references *i* was cited conjointly with another reference *j* within the collected set of articles. In the same way, we additionally measured author collaboration by extracting and documenting the combination of authors that were associated with each of the referencing articles. In order to comprehensibly illustrate the co-citation and collaboration strength between documents and authors, we applied the visualization of similarities mapping technique (Van Eck & Waltman, 2007; Van Eck et al., 2008). In doing so, co-citations and authors are arranged within two-dimensional distance-based maps, implying stronger similarity for closely situated items (i.e., cited documents or authors) and vice versa.[4]

We use VOSviewer software to visualize our network. Compared to programs such as Pajek or SPSS, an advantage of the used VOSviewer software lies in the intuitive overlay which facilitates

[3] Hertzel (1987) provides a thorough overview of the evolution of bibliometrics and the usefulness of co-citation analysis in particular. However, White (2011) mentions possible constraints of citation-based network analysis considering the omission of the amount, quality and therefore impact of scientific output of publishing individuals or affiliated institutions. We address this issue by adding a descriptive dimension to this chapter.

[4] For a more detailed explanation of the methodological steps, see Appendix 3.A.

data interpretation and visibility (for a comparison, see Van Eck & Waltman, 2009). VOSviewer allows it to display a network of co-citations or collaborating authors in two different ways. The labeling option positions documents and authors as nodes within the two dimensional map. The size of a node is determined by the total link strength of the item (as equal to the sum of co-citations or collaborations with other items of the network). Links between nodes are presented as connecting lines that indicate the number of co-citations (collaborations) of two documents (authors). A thicker link indicates a higher co-citation frequency of two items. The second visualization option is the density view where nodes are represented as colors within the map, illustrating concentrations of similar items that translate into areas of intense co-citations or collaborations (Van Eck & Waltman, 2010).

3.2.2 Collection of data

Considering prior work which applied citation-based methods (Dunbar & Weber, 2013; Dyckman & Zeff, 1984; Servantie et al., 2016), we limit our analysis to major research journals and use keywords to identify relevant articles. An abundant amount of scientific studies has scrutinized the influence of generalist and specialist journals in the accounting domain and concludes upon the importance of five leading journals (Ballas & Theoharakis, 2003; Bonner et al., 2006; Brinn, Jones, & Pendlebury, 1996; Brown, 1996; Brown & Huefner, 1994; Chan & Liano, 2009; Jolly, Schroeder, & Spear, 1995; Lowe & Locke, 2005; Rosenstreich & Wooliscroft, 2009; Smith, 1994; Wakefield, 2008). Various additional sources such as the ABS Journal Guide and the 2016 Financial Times research ranking confirm this selection. The five journals used for our analysis therefore are *Accounting, Organizations and Society* (AOS), *Contemporary Accounting Research* (CAR), *Journal of Accounting and Economics* (JAE), *Journal of Accounting Research* (JAR) and *The Accounting Review* (TAR).[5] All five journals are part of the top 15 SCImago journal ranking in the accounting category. The SCImago portal uses citation-based measures to assess and analyze scientific domains. We also perform a separate analysis of the highly ranked *Auditing: A Journal of Practice and Theory* (AJPT) journal because it appears as an influential specialist journal in the ranking. The results indicate that the citation structure of specialist journals is similar to the respective topic in the generalist journals.

The data retrieval process comprised the examination of every single journal issue and was done by searching article titles and keywords that matched with the terms *internal audit(ing)*, *internal audit function* or *internal control*. Where necessary, we scrutinized abstracts and complete

[5] Although included in both the ABS Journal Guide and the 2016 Financial Times research ranking, evidence for the importance of the journal *Review of Accounting Studies* (RAST) within scientific studies is highly inconsistent (e.g., Bonner et al., 2006, p. 666). Since consistency was a central selection criterion for this study, we decided to omit the journal.

Table 3.1
Data collection and analysis process

	Preliminary analysis
	Identification of articles
	(a) with a clear focus on internal auditing,
	(b) that cover internal auditing within at least a subsection, and
	(c) that consider the IAF in any other way (e.g., contain the IAF as a variable).
Sources	AOS (1975 - 2016), CAR (1984 - 2016), JAE (1978 - 2016), JAR (1963 - 2016), TAR (1926 - 2016)
Databases	EBSCOhost, JSTOR, ScienceDirect, SCOPUS, Wiley
Keywords	internal audit(ing), internal audit function, internal control
Result	170 articles between 1926 and 2016
	Data collection
	Elicitation and analysis of relevant data from articles:
	(Author, Organizational affiliation, Country of affiliation, Research method, Year of publication)
	Extraction of cited references from each article via the SCOPUS database or by hand
	Total extracted citations: 6,842
	Citations with missing title or author: 1,348
	Manually supplemented citations: 3,059
Result	6,826 citations in total (5,113 unique references)
	Network preparation
	Computation of a 5,113 x 5,113 co-citation matrix and coding of data to visualize results within VOSviewer
Result	Mapped co-citation network consisting of 230 highly co-cited references

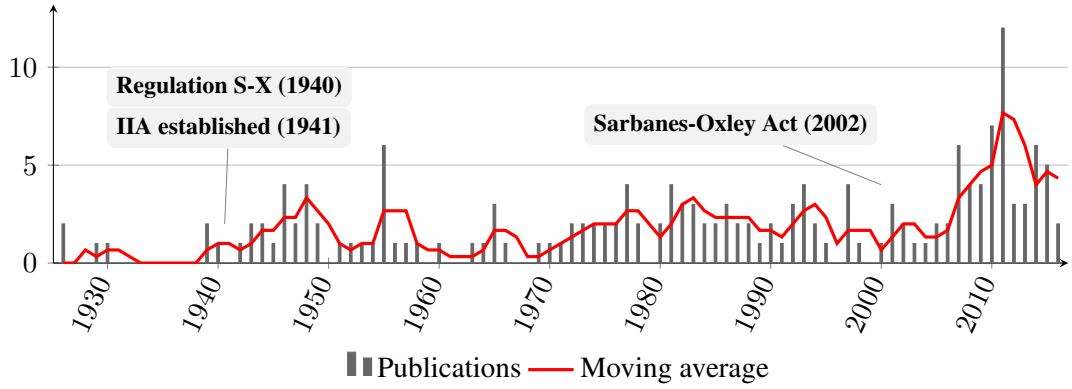
articles on whether they covered auditing or corporate governance topics presumably related to internal auditing or internal controls. Subsequently, extracted articles were reviewed by the authors and included in the study if they matched one of the three categories (a), (b) or (c) shown in Table 3.1. An Excel spreadsheet was used to list selected articles along with any relevant information for the descriptive analysis in the next section. 6,842 citations from these 170 articles (spanning the years between 1926 and end of 2016) could be downloaded from the SCOPUS database. However, due to missing information, the final data consist of 6,826 citations from 5,113 sources. 16 citations had to be dropped due to missing data. The methodology applied for the citation analysis is further described in the results section.

3.3 Descriptive results

3.3.1 Research activity

The distribution of published articles in the accounting journals indicates a growing interest for internal auditing between 1926 and the end of 2016 (see Figure 3.1). Two particular time frames stand out in light of the distribution of studies and emerging research themes. The establishment of the Institute of Internal Auditors (IIA) in 1941 initiates a relatively steep increase in internal audit-related publications that flattens shortly before 1960. About one-fifth of the 170 recorded articles is published during this episode, being covered by only a single accounting journal (TAR, averaging 1.7 articles per year). A similar distribution emerged in the following decades but for a comparatively longer phase of time and a larger body of literature (1.7 articles on average per year between 1960 and 2004; 75 of 170 publications). Research themes during this early stage are focused on the emergence of a sovereign internal audit profession, regulatory changes, and novel approaches to internal audit education.

Figure 3.1
Distribution of published internal audit-related articles in the leading accounting journals



Multiple studies refer to the revised "Regulation S-X" as a regulatory milestone as it initially required external auditors to consider their clients' IAF as part of the internal control structure (Carey, 1940; Fernald, 1943; Sweet, 1940).[6] Moreover, the growing economic consequences of World War II challenged the traditional role model of internal auditors (e.g., McNamee & McNamee, 1995; Perry, 1944; Teitelbaum, 1954). A focus on large-scale production and decentralization of multinational corporations necessitated a management support function that provided much-needed oversight over remote business units. However, the foundation of the IIA and the

[6] This revision dates back to one of the largest corporate accounting scandals of this decade, namely the failure of internal controls of the pharmacy company McKesson & Robbins Incorporation in 1938 (Barr & Galpeer, 1987; Baxter, 1999; Bealing, Dirsmith, & Fogarty, 1996).

ensuing development of the internal auditing profession remained major catalysts for scientific studies around 1941. Discussions about the necessity of official standards, preparatory training, and a guiding auditing framework dominate the scientific discourse within the accounting community during subsequent decades (e.g., Andreae, 1947; Atkisson, 1946; Campfield, 1960, 1965; Kent, 1955; Meigs, 1951).

The period from 2005 to 2016 clearly marks the peak of internal audit research in the five accounting journals. With a total of 56 publications in the mentioned time span, the yearly number of scientific contributions averages 4.7. The endorsement of the SOX is undoubtedly the most profound regulatory change for research endeavors in the early twenty-first century.[7] Especially the banning of non-audit services (including internal auditing) purchased from the incumbent external auditor and provisions on the attestation of effective internal controls over financial reporting constitute central pillars of research that cover the IAF (e.g., Abbott, Parker, & Peters, 2010; Abbott et al., 2007; Beasley et al., 2009; Bédard & Graham, 2011; Prawitt, Sharp, & Wood, 2012). The sudden drop in internal audit studies after the year 2010 might be a direct consequence of the financial crisis that shifted the attention of accounting researchers towards financial and management accounting issues (Arnold, 2009; Hopwood, 2009).

3.3.2 Characteristics of the internal auditing research community

In light of prevailing discussions on the importance of social capital and co-operative networks within research, we briefly analyze the development of internal audit-related co-authorships within the leading accounting journals. Scientific collaboration, in the form of co-authorships or invisible colleges, has been a rapidly expanding phenomenon during the past decades (Ettredge & Wong-On-Wing, 1991; Katz & Martin, 1997). Often viewed as a reaction to increasingly complex research issues, inter-institutional and international collaboration is a manifestation of the growing specialization of scientific competencies (Bush & Hattery, 1956).

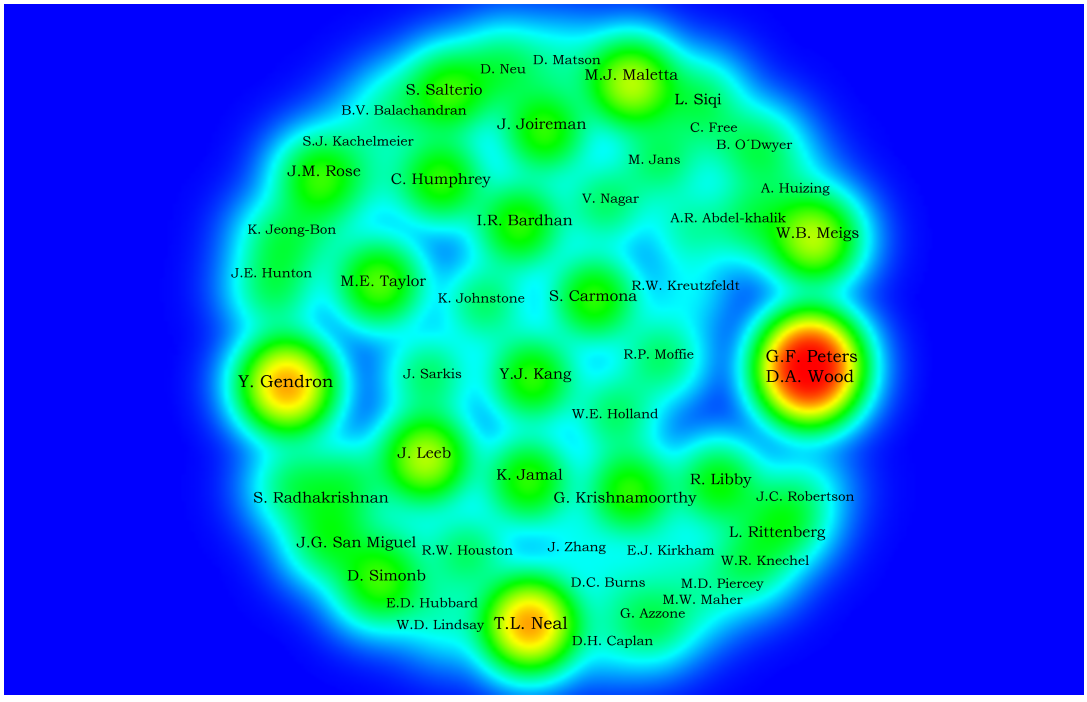
The analysis of internal audit publications reveals an incremental shift towards collaborative efforts within the scientific community. Sole authorships dominate publications between 1926 and 1968 as 91 percent of all internal audit-related articles during this time were authored by a single individual. These individuals are mostly practitioners who express personal opinions via reports or critical comments on the state of the profession. Moreover, a slight increase to an average of about two authors per article is observable between 1968 and 2000 (54 % sole authorships; 30 % two authors; 16 % three or more authors). With the beginning of the twenty-first century, sole authorships decrease to six percent as collaborations of three authors take over and make

[7] The gap of three years between the actual endorsement of SOX and the observed increase in scientific publications can be explained by the often time-consuming publishing process, ranging from the stage of initial conceptualization to the final acceptance of an article.

up more than fifty percent of all publications. However, the most notable growth is recognizable for articles written by at least four authors, as they rise to almost twenty percent between 2000 and 2016. Three authors collaborate on average on each article throughout this period. Taken together, the increase in co-authorships signalizes a thriving collaboration between internal audit researchers which resonates with a global trend in academia.

To add a further dimension, we examine author interconnectedness through direct and indirect co-authorships by applying network analysis to our data: 205 authors have at least once co-authored with another researcher resulting in 57 networks of collaborating individuals. These networks are displayed as colored clusters in Figure 3.2. Only three of these small networks consist of more than six researchers making their distinction recognizable through an orange or red coloration in the density view (see Figure 3.2). The three most interconnected groups of researchers are located on the left, right, and bottom areas of the network.

Figure 3.2
Heat map of the collaboration network



Note: Colored clusters represent 57 groups of collaborating authors. An orange or red cluster coloration illustrates strong interaction within a network of researchers. The three most interconnected groups are located on the left, right, and bottom areas of the map.

It becomes apparent that *D.A. Wood* is a central figure within the research community as he has collaborated with nine different researchers on up to three articles in the top accounting journals. Also, nine remaining researchers of the cluster are indirectly related to this author based

on collaborations with his co-authors. The complete list of authors including their average link strength (i.e., average collaboration times with another researcher of the cluster) reads as follows:

- D.A. Wood (1.33); G. Peters (1.57); L. Abbott (2); S. Parker (2); A. Masli (1); D. Prawitt (1.5); N. Sharp (1.25); W.F. Messier (1); D.V. Rama (1); J.K. Reynolds (1); V.J. Richardson (1); J.M. Sanchez (1); C.A. Simon (1); M.H. Christ (1); B. Daugherty (1); A. Schneider (1); J. Smith (1); S. Glover (1); N. Wilner (1).

An average researcher in this group collaborates with four other group members indicating relatively intense interaction and contribution compared to an average author in our dataset.

The second group surrounding *Y. Gendron* and *J.C. Bédard* consists of 13 authors who on average collaborate with about three other authors within their network. A higher concentration is observable for the third group surrounding *T. Neal* and *J.V. Carcello* in which nine authors publish together with about four authors on average for approximately one time. Table 3.2 provides an overview on the most influential authors with respect to publication activity and network presence.[8]

Table 3.2
Most influential authors

Name	Publications	Co-authors	Avg. link strength	Affiliation
Wood, D.A.	5	9	1.33	Brigham Young University
Maletta, M.J.	5	5	1.40	Northeastern University, Boston
Peters, G.F.	4	7	1.57	University of Arkansas
Gendron, Y.	4	6	1.00	Université Laval
Abbott, L.J.	3	4	2.00	University of Wisconsin, Madison
Schneider, A.	3	2	1.00	Georgia Institute of Technology
Parker, S.	3	4	2.00	Santa Clara University
Prawitt, D.	3	4	1.50	Brigham Young University

Note: Information on author affiliations was collected directly from internal audit-related studies.
The average link strength equals the average number of collaborations of the author with another researcher across a set of 170 internal audit-related articles.

[8] We additionally gathered information on the affiliated institutions for most of the authors and were able to match data from 147 of the 170 articles. Overall, nine organizations and 130 academic institutions could be identified; 297 authors or co-authors were affiliated with them across all publications. Our findings, as summarized in Appendix 3.B, highlight the 20 most frequently mentioned institutions regarding sole or co-authorships.

In a final step, we divided our set of articles into three periods of nearly equal length to illustrate publication trends for six different research approaches (see Smith, 2014) in the selected journals. Our findings (see Appendix 3.C) resemble the general evolution of accounting research over the three periods. That is, archival-based empirical studies tend to be the dominant way of conducting internal audit research, not only in four of the five accounting journals, but also throughout the entirety of our analyzed set of articles.[9] With 43 percent of the 170 studies, archival publications are equal to the number of experimental, conceptual, and qualitative publications. We also note that the leading accounting journals are introducing more experimental internal audit studies over time whereas conceptual approaches have diminished. This decline of conceptual studies seems to be closely tied to the selected accounting journals that have developed a strong focus on established empirical methods rather than interpretive or critical approaches (Baker & Bettner, 1997).

Taken together, our findings draw the picture of a widely spread research community that over time shows signs of consolidation, manifesting itself in the increased number of collaborations and the existence of three established research networks. Within the analyzed top journals, however, internal auditing remains a niche topic which is often times not touched upon more than once by a vast majority of researchers. A possible explanation might be that internal auditing is not perceived as a fruitful and standalone field of research given its current status of infancy (e.g., DeFond & Zhang, 2014). Although archival methods seem to successfully pave the way for an internal audit-related publication in one of the top five journals, we also note a slight increase in experimental, qualitative and survey studies over time.

3.4 Bibliometric results

3.4.1 Citation analysis

Before the analysis of citation co-occurrences, we examined the structural composition of the 5,113 cited documents. More than 80 percent of the references were cited once within the set of 170 articles while about 14 percent appeared two or three times. Moreover, less than four percent of the sources were cited more than three times. This implies a high concentration for a very small fraction of sources.[10]

When looking at the content of frequently cited sources (presented in Table 3.3), a prominence

[9] We refer to qualitative research as either field work, interview, or case study approaches (see Smith, 2014).

[10] This corresponds to common theories related to citation frequencies of scientific evidence. For an example see *Zipf-Pareto's law* in Yablonski et al. (1980): "It is always possible to single out a small number (the 'nucleus') of specialized journals that carry the main informational load of the field under study, and a vast number of peripheral journals that are sometimes quite remote from this scientific discipline. The same applies also to other disciplinary parameters: scientific contacts, citation networks, etc." (Yablonski et al., 1980, p. 4).

of regulatory provisions and professional standards becomes apparent. The public law 107-204 (SOX) stands out saliently as it is the most frequently cited source across all articles. Especially its Section 404, which specifies management's responsibility to implement and assess an adequate internal control structure, serves as a consistent starting point for internal audit research.

The distribution of citations reveals another interesting feature of internal audit-related studies. As at least four of the ten most frequently referenced sources deal with the internal-external auditor relationship (i.e., determinants of the reliance of external auditors on internal auditing), demonstrating an inseparability of internal auditing from the external audit domain within the leading accounting journals. Also, Schneider (1984) and Schneider (1985) are among the first published studies that entrenched within research the then continually expanding IAF evaluation criteria of competence, objectivity, and work performance. Except for Abbott (1988), the remaining articles are a rather broad reflection of the re-emerging corporate governance debate at the end of the twentieth century.

Table 3.3
Most frequently cited documents

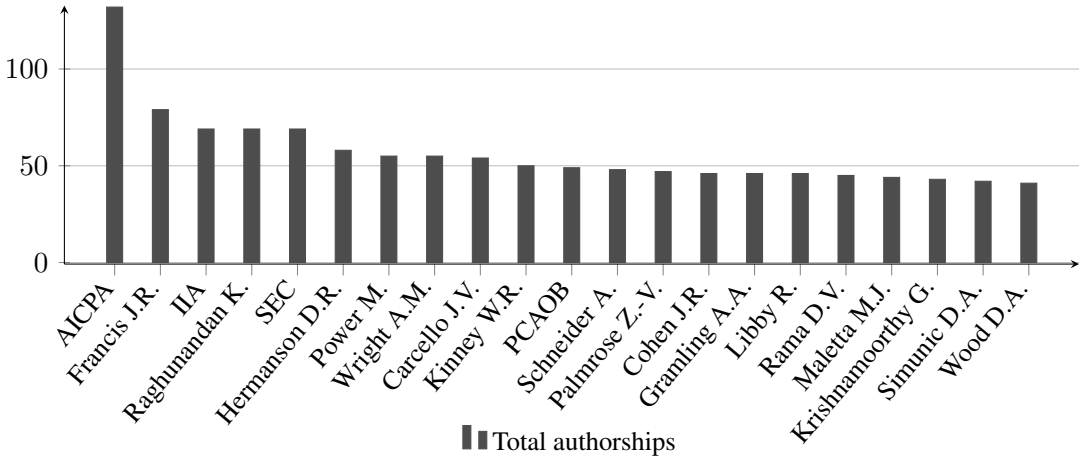
Document label	Citations	Document type	Subject matter
Sarbanes-Oxley Act (2002)	20	Law	Public law concerning the protection of investors by an improved accuracy of financial statements
Auditing Standard No. 5 (2007)	13	Standard	Audit of internal control over financial reporting that is integrated with an audit of financial statements
Brown (1983)	12	Article	Evaluation of the IAF by the external auditor (SAS No. 9)
Felix/Gramling/Maletta (2001)	12	Article	Internal auditing as a determinant of the external audit fee
Frankel/Johnson/Nelson (2002)	12	Article	Effect of non-audit fees on earnings management
Schneider (1984)	12	Article	Evaluation of the IAF by the external auditor (SAS No. 9)
Schneider (1985)	12	Article	Evaluation of the IAF by the external auditor (SAS No. 9)
Cohen/Krishnamoorthy/Wright (2002)	11	Article	Impact of corporate governance on the audit process
Dechow/Sloan/Sweeney (1996)	11	Article	Earnings management and SEC enforcement
Abbott (1988)	10	Monograph	The system of professions: An essay on the division of labor
Beasley et al. (2000)	10	Article	Fraud and Corporate Governance

Note: Citation information was collected from reference lists of internal audit-related studies.

Analyzing the authors of the 5,113 cited documents further reinforces the impression of a profound regulatory influence on internal auditing within accounting research (see Figure 3.3). Governmental and standard-setting institutions are among the most influential authors found in an article's reference list as the AICPA (131 times cited), the SEC (69 times cited), as well as the IIA (68 times cited), and PCOAB (49 times cited) all make an appearance in the list of highly cited authors. Publishing internal audit studies in one of the leading accounting journals thus seems to be predicated upon the incorporation of principles prevalent within regulations and professional

standards.

Figure 3.3
Frequently cited authors and institutions



Note: Citation information was collected from reference lists of internal audit-related studies published in leading accounting journals.

As for the non-institutional authors, *J. R. Francis* most notably appears with 79 citations. Sources associated with the author are focused mainly on external auditing, dealing with its quality and pricing, the constitution of the audit market, and the provision of services beyond external financial statement audits (e.g., Ferguson, Francis, & Stokes, 2003; Francis, 2006; Francis & Simon, 1987). A stronger focus on internal auditing is observable for the Raghunandan, Rama, and Read (2001) study, which as the authors' most frequently cited article investigates the composition of audit committees and their crucial interrelationship with the IAF. The remaining frequently cited authors bear little relation to internal auditing as most of their cited studies address other corporate governance protagonists (executive management, audit committees, and external auditors) who interact with the IAF on a regular basis.[11]

3.4.2 Co-citation and cluster analysis

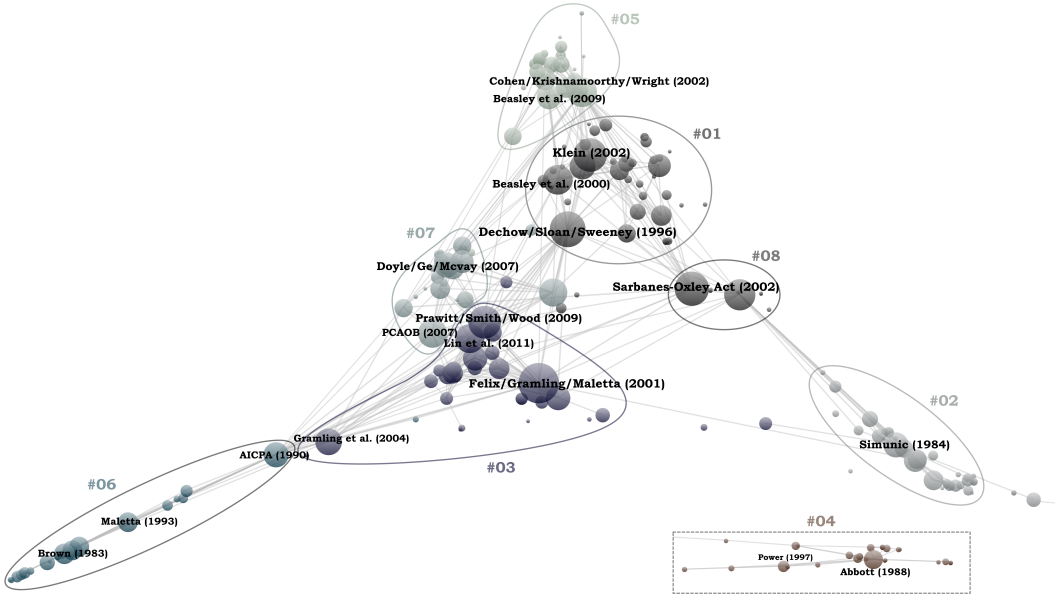
A co-citation matrix was constructed consisting of 5,113 unique references that in total were cited 6,826 times. To avoid ambiguity in our results, we set the minimum link strength of co-cited items to three.[12] The results of the final co-citation network are exhibited in Figure 3.4. We

[11] *D. A. Wood*, as an exception, includes internal auditing as a central theme in almost 80 percent of his cited works.

[12] The link strength indicates the number of times that two sources occur jointly in a list of references of the 170 articles. Despite the general lack of theoretical guidance for the optimal link strength, our chosen value eliminates random observations as it reduces our network to a consistent core of 230 documents with an average link strength of 3.4.

apply cluster analysis based on co-citation link strength to the 230 included documents. This method allows us to divide the 230 network nodes into eight different clusters, illustrated as groups of closely located items within the network. This technique has the underlying assumption that distinguishable subdomains of the studied research field are identifiable based on the intensity of co-citation activities displayed as clusters (Small & Griffith, 1974). Each cluster contains studies which exhibit strong links to one another (i.e., that frequently occur together in internal audit-related articles). The distribution of items on each cluster has a mean of 28.8 and a standard deviation of 8.2.

Figure 3.4
Co-citation network of internal audit-related articles published in leading accounting journals



Note: The nodes represent 230 highly co-cited documents within internal audit-related articles. A thicker node equals a higher number of co-citations with other items of the network. Links (illustrated as lines) between nodes indicate the number of co-citations of two documents. A thicker link indicates a higher co-citation frequency.

An in-depth analysis of the respective items regarding content and structure made it possible to infer central themes that characterize each cluster. Our remarks are limited to relevant documents based on their cluster representativeness and network influence. A detailed overview on the internal audit-relatedness of studies within each cluster is provided in Table 3.4. The eight clusters are labeled and concisely resumed as follows:

Table 3.4
IAF-relatedness of studies per cluster

	IAF-relatedness of cluster studies					
	Direct		Peripheral		Unrelated	
	Total	Pct. (%)	Total	Pct. (%)	Total	Pct. (%)
Cluster no. 1	0	0	10	24	31	76
Cluster no. 2	2	5	8	21	28	74
Cluster no. 3	19	61	1	3	11	35
Cluster no. 4	0	0	5	16	26	84
Cluster no. 5	0	0	12	44	15	56
Cluster no. 6	20	80	2	8	3	12
Cluster no. 7	0	0	4	17	20	83
Cluster no. 8	7	54	3	23	3	23

Note: Studies that are frequently co-cited throughout the set of articles; Direct = Studies with a clear focus on internal auditing; Peripheral = Studies with a minor focus on internal auditing (e.g., within a subsection or as a variable); Unrelated = Studies are unrelated to internal auditing.

- **Cluster no. 1:** ***Corporate Governance***

The co-cited documents of this cluster are without exception embedded into the current corporate governance debate. Forming the theoretical groundwork of this debate, Fama and Jensen (1983), Jensen (1993) as well as Jensen and Meckling (1976) address the issue of firm ownership and control separation which implies a need for corporate boards that exercise effective firm monitoring. More recent cluster studies provide empirical evidence on how certain corporate governance input factors influence earnings management or financial statement fraud. Moreover, articles on the composition, responsibility, and interrelationship of audit committees and boards of directors constitute the centerpiece of the cluster (e.g., Abbott, Parker, & Peters, 2004; Beasley, 1996; Bédard, Chtourou, & Courteau, 2004; Carcello & Neal, 2003; DeFond, Hann, & Hu, 2005). The role of external auditors, in contrast, is infrequently considered in studies (e.g., Abbott & Parker, 2000; Carcello & Neal, 2000; Francis, Maydew, & Sparks, 1999).

The three integral works of this cluster are the Klein (2002a), Dechow, Sloan, and Sweeney (1996) and Beasley et al. (2000) studies. The former two investigate the association between weak governance structures (e.g., lack of adequate audit committees, boards of directors, and outside blockholders) and incentives for earnings management. Beasley et al. (2000) extend this conception of corporate governance by introducing the IAF as an additional fraud prevention mechanism

in technology, healthcare, and financial services industries. Also, Vafeas (2005), in his reference to the *Report and Recommendations of the Blue Ribbon Committee on Improving the Effectiveness of Corporate Audit Committees* (BRC), contemplates a substitutive relation between IAFs of high quality and effective audit committees. As the BRC report is also part of the network, we conjecture that its implications add to the growing relevance of the IAF within contemporary corporate governance research.

Taken together, the composition of studies in this cluster reveals a precursory state of corporate governance research in which internal auditing only plays a minor role. This notion is supported by the fact that an average document in this cluster is not published before the year 2000 and that most of the studies refrain from considering the IAF as a determinant of financial statement quality altogether (e.g., Bédard, Chtourou, & Courteau, 2004; Dechow, Sloan, & Sweeney, 1996; Klein, 2002a). Abbott, Parker, and Peters (2004), attempting to add internal auditing to the governance equation, find no significant association between internal audit presence and financial statement restatements as they supposedly are unable to measure the effectiveness of the function (see Abbott, Parker, & Peters, 2004, p. 84).

Overall, authors of earlier studies in the field of corporate governance seem to only hesitantly recognize internal auditing as a core element of the governance framework. The first cluster is consequently limited in its ability to go beyond defining the broad context of internal audit-related articles published in the examined accounting journals.

- **Cluster no. 2: *Auditor Independence***

The 38 documents of the second largest cluster concentrate on a variety of topics related to the external audit profession. These include auditor independence, as affected by non-audit services (Ashbaugh, LaFond, & Mayhew, 2003; Chung & Kallapur, 2003; DeFond, Raghunandan, & Subramanyam, 2002; Firth, 1997; Francis, 2006; Parkash & Venable, 1993; Simunic, 1984), and the general pricing of audit services (DeAngelo, 1981a; Larcker & Richardson, 2004; Palmrose, 1986; Reynolds, Deis, & Francis, 2004). A substantial number of the included studies is dedicated to the spillover versus economic bonding argument (Davis, Ricchiute, & Trompeter, 1993; Simunic, 1984). Benefits of a knowledge transfer from audit to non-audit services beyond the auditor's traditional scope (e.g., consulting, tax, or internal audit services) are thereby contrasted by their potential to impair auditor independence and negatively affect financial statement quality.[13]

Internal audit services, as part of the external auditor's non-audit service portfolio, are briefly mentioned in this cluster. Kinney, Palmrose, and Scholz (2004), for example, compare non-audit fees for 617 financial statement restating and nonrestating SEC registrants and find no significant

[13] The *Final Rule: Revision of the Commission's Auditor Independence* (SEC, 2000) serves as the regulatory backbone of this discussion as it is found at the center of the cluster.

relationship between costs for internal auditing provided by the incumbent auditor and restatements of their financial reports. The authors further register that only a small minority of examined registrants obtain internal audit-related services (5 %) that make up for less than one percent of the total audit fee. Also, Wallace (1984) and Palmrose (1986) are among the first cluster studies to factor in internal audit services as client sided efforts (e.g., amount of internal audit contribution) and to empirically demonstrate their potential to lower external audit fees. Wallace (1984), in particular, provides pioneering evidence by quantifying possible fee discounts in scenarios where external auditors benefit from work or direct assistance of internal auditors.

Based on the content and structure of the co-cited cluster documents, we conclude that research on internal audit outsourcing and its contribution to external audits emerges from the literature on auditor independence and audit pricing. Considering that the cited items partly represent the knowledge base of accounting scholars, we infer that theoretical implications of the auditor independence and pricing debate determine value relevance of internal audit studies in the leading accounting journals. However, we do acknowledge that the insights and number of studies in this cluster at best scratch the surface of internal audit research. The cluster items ultimately reflect upon the debate of external auditor independence and the pricing of related services. Consequently, we interpret this cluster as a point of origin of internal audit relevance within the analyzed accounting journals.

- **Cluster no. 3: *"Internal Auditing Nucleus"***

The third cluster, as the focal point of the network, includes a core of highly co-cited literature that concentrates mostly on the IAF in varying contexts.[14] It is interlinked via co-citations with every other cluster except for cluster number four which reveals its function as a nexus between different network clusters. It also contains the most contemporaneous IAF research as 29 of the 31 documents were published between 2006 and 2011. In terms of impact, six of the top-20 co-cited documents stem from this cluster. Felix, Gramling, and Maletta (2001) excels as the most interconnected study of the network as it is co-cited with 60 documents in about four articles on average. Examining the contribution of internal auditors to financial statement audits, the authors find evidence for a cost reduction of external audits especially when internal auditors of high quality are available. Another network study concludes that a significant proportion of audit fee reductions is achieved through internal auditors directly assisting external auditors during financial statement audits (Prawitt, Smith, & Wood, 2011). Three other articles expand on this topic by considering how client pressure, the use of the IAF as a rotational career development program, and internal audit outsourcing affect external auditors' perceptions on the quality of the function

[14] A majority of the unrelated studies are located in transitional areas of adjacent clusters and are with few exceptions limited in their impact on the network.

(Felix, Gramling, & Maletta, 2005; Glover, Prawitt, & Wood, 2008; Messier et al., 2011).

The cluster further advances the discussion on direct consequences of the SOX Section 201 banning of internal audit outsourcing to the incumbent audit firm. Abbott et al. (2007) find no evidence that external auditors suffer from impaired independence when providing only nonrecurring internal audit services. Prawitt, Sharp, and Wood (2012) even report a decrease in accounting risk for companies that outsource internal auditing to their incumbent auditor. Moreover, the authors find this effect to be more pronounced for companies that outsource to their incumbent Big N auditor. Questioning objectivity of in-house IAFs, Ahlawat and Lowe (2004), as a transitional study between two clusters, find evidence which implies slight objectivity vantages for outsourced IAFs. The tenor of insights on the SOX provision on internal audit outsourcing, as represented by the cluster, demonstrates a considerable level of skepticism towards the outcomes of this regulation.

The third component of cluster documents is a reflection of the incorporation of internal auditing into corporate governance research. In this context, studies emphasize internal audit quality as a deterrent to earnings management, weaknesses in the internal control over financial reporting structure, and fraud. Prawitt, Smith, and Wood (2009) find that IAFs with high levels of competence, objectivity and work performance can be associated with less earnings management (i.e, lower likelihood of narrowly missing earnings forecasts and lower levels of negative abnormal accruals). Lin et al. (2011) report that specific IAF characteristics and structures, such as the level of education, implementation of quality assurance measures, and audit scope including follow up procedures, are negatively related to disclosed material weaknesses. Considering fraud, Coram, Ferguson, and Moroney (2008) observe a positive effect of (in-house) IAFs on the detection of asset misappropriation, while two other studies argue that reporting lines and the role interpretations of internal auditors determine the effectiveness of fraud prevention (Asare, Davidson, & Gramling, 2008; Norman, Rose, & Rose, 2010). The highly co-cited literature synthesis on internal auditing within the governance framework by Gramling et al. (2004) further corroborates the notion of an established internal audit role prevalent within the set of articles.

The cluster also contains a small range of practical internal audit issues dealing with its role within corporate risk management or the implications of conflicting reporting lines to both the audit committee and executive management (Abbott, Parker, & Peters, 2010; Sarens & De Beelde, 2006a).

Three observations become discernible when considering the central themes of this cluster. First, given the dominance of certain cluster items, we note that the internal-external auditor relationship along with its implications for the external audit fee and quality is the most frequent research topic when it comes to publications in the top accounting journals. Internal audit research contribution and relevance, as perceived by the accounting community, are therefore closely tied to its relation to external auditing. However, this discussion seems to be narrowed down to the view of internal auditors as potential henchmen for external auditors. The concept of IAF objectivity

and competency, as constituted by the *Statement on Auditing Standards (SAS) No. 65*, has in this context emerged as a tangible and regulated IAF quality evaluation mechanism (AICPA, 1990).

Table 3.5
Examples of internal audit quality measures

	Measures of internal audit quality
Felix et al. (2001)	External auditor assessment of overall internal audit quality
Prawitt et al. (2009)	Average number of years of internal auditing experience of the internal auditors in the IAF
	Percentage of internal auditors in the IAF who have the CIA or CPA certification
	Average number of hours of training the internal auditors completed during the year
	Average, industry adjusted investment of the entity into the IAF divided by average total assets
	Reporting line of the head of the IAF to the audit committee or to management
	Percentage of internal audit time spent performing financial auditing
Lin et al. (2011)	Average number of years of auditing experience (internal and external) of the audit staff
	Percentage of professional staff members with one or more audit certifications
	Annual hours of training per internal auditor
	Average number of years of undergraduate and graduate education of the audit staff
	Total annual operating costs of the IAF divided by firm assets
	The amount of control-related information the CAE reviews with the audit committee
	Whether the CAE is an officer of the firm
Ege (2015)	Average number of years of internal auditing experience of the internal auditors in the IAF
	Percentage of internal auditors in the IAF who have the CIA, CPA or CFE certification
	Average number of hours of training the internal auditors completed during the year
	Average, industry adjusted investment of the entity into the IAF divided by average total assets
	Functional IAF reporting line to the audit committee
	The IAF not being used as a management training ground
Abbott et al. (2016)	Average investment of the entity into the IAF per hour
	Relative level of audit committee influence exerted over the IAF compared to management
	The IAF not being used as a management training ground
	Level of IAF outsourcing

Note: Articles were chosen based on their recency. CAE = Chief Executive Auditor, CIA = Certified Internal Auditor, CFE = Certified Fraud Examiner, CPA = Certified Public Accountant.

Second, as illustrated by two influential cluster studies about internal auditing's impact on financial statement quality (Lin et al., 2011; Prawitt, Smith, & Wood, 2009), there is a transition of the quality concept (IAF competence and objectivity) into other areas of research such as corporate governance. This observation even applies to more recent studies not included in the cluster (see

Abbott et al., 2016). However, the operationalization of IAF quality measures, as shown in Table 3.5, is inconsistent across most studies, making internal audit quality a volatile construct within internal audit research.

There is also no clarity as to whether some of the latest quality surrogates (e.g., stakeholder opinions or expended IAF costs) can substitute already established ones. Moreover, prior studies suggest that commonly deployed IAF quality measures (e.g., as mentioned in SAS No. 65) might be limited in their ability to capture internal audit quality (e.g., Gramling & Myers, 1997; Gramling & Vandervelde, 2006; Trotman & Duncan, 2017). This inability is further illustrated by the introduction of rotational IAF career programs as surrogates for impaired IAF objectivity, obscuring the fact that such IAFs exhibit higher levels of competence, ability, and appeal for business professionals (Bartlett et al., 2016; Carcello et al., 2018; Christ et al., 2015). Also, Trotman and Duncan (2017) suggest that quality-related judgments vary among stakeholders and explain internal audit quality as a complex multidimensional construct (composed of inputs, processes, outputs, outcomes, and the context of internal auditing) that goes beyond the perception of external auditors.

Third, we observe a general lack of practical research on internal audit processes and prominent issues within the profession. For example, little is known about internal audit effectiveness except for its contingency upon organizational and environmental influences (e.g., Alzeban, 2015). The limited amount of studies is inconclusive as to whether direct outcomes of the audit (Arena & Azzone, 2009; Soh & Martinov-Bennie, 2011) or perceptions of critical stakeholders (Sarens & De Beelde, 2006b) define effective IAFs.

- **Cluster no. 4:** ***Auditing Professionalization***

Being structurally unrelated to other clusters and showing only weak co-citation impact, cluster number four comprises several sources on the emergence and constituting features of a profession (e.g., Abbott, 1988). Power (2004), on the one hand, registers a transformation of the auditing profession that is strongly affected by regulatory interventions which promote the expansion of internal controls and risk management. Pentland (1993), on the other hand, conducts a field study to investigate the daily works of auditors and notes that rituals help auditors to reach consensus on ambivalent accounting issues. Ritual procedures, therefore, are a stable element of the auditor's decision-making process and part of the auditor's professional identity.

However, only marginal remarks on the progression of internal auditing are observed in this cluster. Due to its secluded positioning and limited co-citation linkages to the rest of the network, we do not perform a more detailed analysis of this cluster.

- **Cluster no. 5:** ***Audit Committee Effectiveness***

Cluster number five, for the most part, is an assembly of studies committed to the investigation of audit committee effectiveness. About half of the co-cited studies concentrate on characteristics

that facilitate the oversight role of audit committees as a governance mechanism. DeZoort et al. (2002) suggests four major dimensions that are determining the effectiveness of audit committees that also resonate with the composition of most of the archival studies in this cluster. The four dimensions include audit committee composition (understood as level of expertise, independence, integrity, and objectivity), authority (documented responsibilities and influence), resources (adequate number of members, access to management as well as external and internal auditors), and finally the degree of diligence (number of audit committee meetings and voluntary disclosures).

None of the archival cluster studies include information about the role or influence of internal auditing and thus are unrelated to the function.[15] Contrarily, most of the qualitative studies indicate a recognizable impact of the IAF when it comes to audit committee effectiveness in practice. Gendron, Bédard, and Gosselin (2004) and Gendron and Bédard (2006), through interviews with board members and internal auditors, reveal the pivotal role of the latter who provide meaningful insights on organizational problems and potential for improvement to audit committee members. Following the authors' remarks, internal audit reports and follow-up procedures support members of the audit committee to hold management accountable and thus are a critical factor in their interpretation of corporate accountability.

The close interdependency of the two governance parties becomes evident in several other qualitative studies of the cluster (e.g., Kalbers & Fogarty, 1993; Turley & Zaman, 2007). In their review of the empirical audit committee literature, DeZoort et al. (2002) refer to the IAF as a contributing factor to audit committee independence, concluding that IAF support and interaction is of "unique importance" in yielding enhanced audit committee effectiveness. Also, Beasley et al. (2009), in their study on the nature of audit committee processes, suggest that, regarding IAF interaction and oversight, audit committees are highly attentive towards internal auditors' work and generally rely on both internal and external auditing when evaluating the effectiveness of internal controls over financial reporting. The authors further mention multiple reporting lines to governing institutions (e.g., CFO, CEO and audit committee) to cause a potential threat to internal audit independence due to conflicting interests.

Another small strand of cluster items is related to external auditors' perceptions of audit committees and corporate governance in the pre- and post-SOX era. Cohen, Krishnamoorthy, and Wright (2002), in their pre-SOX study, note that senior management is viewed as a driving force for client governance by external auditors and that internal auditors are perceived as less determi-

[15] One reason for the omission of internal auditing is the data availability of internal audit information. For example, Dhaliwal, Naiker, and Navissi (2010) note: "internal auditors can also play a role in preserving financial reporting quality by monitoring organizational risks and assessing internal controls. [...] We do not control for internal auditing because of the significant time and cost constraints involved in identifying the presence of an internal auditing function for our large sample" (Dhaliwal, Naiker, & Navissi, 2010, p. 803). Most of the other archival studies of the cluster follow a similar rationale (e.g., Krishnan & Visvanathan, 2008; McDaniel, Martin, & Maines, 2002; Srinivasan, 2005).

native based on their focus on "micro level rather than on overall corporate operations or controls" (Cohen, Krishnamoorthy, & Wright, 2002, p. 585). In contrast, Cohen, Krishnamoorthy, and Wright (2004) conceptualize a stakeholder-oriented corporate governance framework and highlight valuable synergy potentials for co-operating audit committees and internal auditors. This shift in perceptions is further substantiated by Cohen, Krishnamoorthy, and Wright (2010), who find evidence that audit committees consider the IAF in the post-SOX era to be "[...] a key element of the corporate governance mosaic of the firm" (Cohen, Krishnamoorthy, & Wright, 2010, p. 780).

Overall, this cluster is revealing regarding the interplay of internal auditors and audit committees and exhibits a potentially fruitful area of future archival and qualitative internal auditing research. However, given their absence in the cluster, it is worth noting that existing survey-based studies on (in)formal interaction processes of audit committees and internal auditors (e.g., Alzeban & Sawan, 2015; Goodwin, 2003; Zain, Subramaniam, & Stewart, 2006; Zaman & Sarens, 2013) have little impact on articles in the leading accounting journals. With only two exceptions (Kalbers & Fogarty, 1993; Turley & Zaman, 2007), all of the studies in the cluster focus on a North American context and apply archival, experimental or qualitative research methods.[16] As many existing survey-studies use non-US data, it appears that choice of method and differing national statutes have a detrimental effect on the relevance of these studies. Also, surveys might be limited in their ability to capture profound informal drivers of audit committee effectiveness such as informal meetings with internal auditors (e.g., Zaman & Sarens, 2013). However, this limitation may also be a corresponding trend for non-survey studies (e.g., Sarens, De Beelde, & Everaert, 2009). Thus, the inference can be drawn that although there are multifaceted survey-studies available on the relationship between the IAF and audit committees (e.g., Alzeban & Sawan, 2015; Barua, Rama, & Sharma, 2010; Sarens, De Beelde, & Everaert, 2009), these studies gain little recognition by articles in the leading accounting journals.

- **Cluster no. 6:** ***Reliance on Internal Auditing***

Containing the essential corpus of studies on the determining factors of the external auditor's decision to rely on internal audit work, cluster number six represents a highly developed research area. The arrangement of cluster items reveals the chronicle of this topic within research studies.

More than 17 of the 25 co-cited cluster documents employ an experimental design and use external audit practitioners as subjects to investigate external auditors' reliance decision. Although methodological approaches remain constant over time, there is a distinct evolution of criteria that external auditors use to determine the quality of the IAF. These criteria are covered by the two

[16] Included studies on audit committee effectiveness not cited in the cluster description are DeZoort (1998) and Cohen, Krishnamoorthy, and Wright (2008).

guiding statements on auditing standards during this time, *Statement on Auditing Standards (SAS) No. 9* (AICPA, 1975) and its successor *Statement on Auditing Standards (SAS) No. 65* (AICPA, 1990).

Starting in 1974, Ashton (1974) investigates the consistency of external auditors' internal control judgments regarding the quality of a subset of internal controls that in some cases was audited by internal auditors. Studies published during the following two decades introduce a more sophisticated view on internal auditing, as the level of competency, objectivity and prior work performance start to define how external auditors assess internal audit quality (e.g., Clark, Gibbs, & Schroeder, 1981; Gibbs & Schroeder, 1979).

Presenting evidence for the importance of objectivity, Abdel-Khalik, Snowball, and Wragge (1983) note that auditors place higher reliance on internal auditors that have direct reporting lines to the board as opposed to the company's controller. Given this state of internal audit independence, external auditors adjust their audit program by allocating fewer resources to tasks that are covered by internal auditors.

Subsequent studies of the cluster agree upon internal auditors' work performance as the dominant factor used to evaluate the IAF (Brown, 1983; Margheim, 1986; Schneider, 1984, 1985). Brown (1983) is among the first to consider intermingling effects between all three evaluation criteria. In an experiment with 101 auditors from four "Big N" firms, he finds that internal auditors' satisfactory work performances outweigh competency and objectivity when external auditors assess internal audit reliability. Similarly, both Schneider (1984) and Schneider (1985) use a three-stage experiment to find that work performance, in the form of quantity and quality of internal audit documentation and scope of work, tends to be the most important criteria among the highly consensual test subjects. This finding is confirmed by Margheim (1986), who puts a combined measure of competency and work performance to the test and reports that higher levels of this combination most likely determine a reduction of planned external audit hours as a result of internal audit reliance.

This discussion is becoming more nuanced by the end of the 1980s and the beginning of the 1990s. Maletta and Kida (1993), for example, consider the external auditor's assessment of internal auditors as potential audit assistants to be conditional on the client's level of inherent risk. The authors observe that all three quality criteria are equally important when strong controls and high inherent risk exist, but that utmost importance is ascribed to competency when the latter is low. Also, Maletta (1993), in an experiment with more than sixty audit managers from one "Big N" firm, conclude that IAF competence (level of staff experience and quality of supervision) is of comparatively higher importance than the other two characteristics across all levels of a client's inherent risk. Additional evidence for the relative importance of competency, followed by objectivity and work performance, is provided by Messier and Schneider (1988). Krishnamoorthy (2002) reviews the aforementioned literature and questions the notion of a hierarchy among inter-

nal audit competency, objectivity and performance, stating that it "[...] may be more complex than has been characterized in prior research, and an attempt to discern a generalizable rank order of the factors may be futile" (Krishnamoorthy, 2002, p. 96).

Overall, we conclude that cluster number six captures the evolution of research on the external auditor's evaluation of IAF quality during the time between the issuance of *SAS No. 9* and shortly after the endorsement of its successor, *SAS No. 65*. The implications of the regulatory documents play a vital role in internal audit research as *SAS No. 65* is one of the most frequently co-cited items of the cluster, having strong links to three other clusters. With the cluster essentially tracing the historical evolution of studies on the (direct or indirect) reliance decision of the external auditor, we observe that researchers have continued to explore the concepts of IAF competency and objectivity. The debate of recent insights on this topic has transitioned into the third cluster and is part of the remarks on the internal-external auditor relationship (e.g., Glover, Prawitt, & Wood, 2008; Messier et al., 2011).

- **Cluster no. 7:** ***Internal Control over Financial Reporting***

Positioned adjacent to the third cluster, cluster number seven goes into depth on the determinants of the internal control disclosures of companies in light of SOX Sections 302 and 404. Three essential studies form the cornerstones of this cluster. Ashbaugh-Skaife, Collins, and Kinney (2007) and Doyle, Ge, and McVay (2007a) consider disclosures on either internal control deficiencies or weaknesses (SOX Section 302 and 404) and report that smaller, more complex and financially weak organizations that exhibit frequent restructuring activities are more likely to disclose such control-related issues.[17] Regarding disclosure incentives, the results highlight the significance of superior audit suppliers, concentrated institutional ownership, and former sanctioned accounting malpractice. Also, Krishnan (2005) detects that the number of financial experts and degree of independence of audit committees are negatively related to internal control issues. The study reports no such effect for the presence of an internal audit department.

Doyle, Ge, and McVay (2007b) establish a connection between these findings and financial reporting quality as they provide evidence for a relationship between disclosed internal control weaknesses and lower financial reporting quality. Following a similar line of reasoning, two other cluster documents suggest that well-resourced audit committees and independent boards promote timely remediations of internal control deficiencies with the latter leading to an enhanced financial reporting quality (Ashbaugh-Skaife et al., 2008; Goh, 2009).

The conception of internal auditing in most of the cluster documents reveals a certain ambiguity as several studies consider internal auditors as a core element of companies' internal controls

[17] A material weakness describes a significant deficiency or combination of significant deficiencies, that results in more than a remote likelihood that a material misstatement of the annual or interim financial statements will not be prevented or detected (PCAOB, 2004).

(e.g., Ashbaugh-Skaife et al., 2008; Hammersley, Myers, & Shakespeare, 2008), while others emphasize the oversight role of the function regarding internal controls over financial reporting. None of the cluster studies, however, go beyond measuring the mere existence instead of the characteristics of the IAF. For example, Krishnan (2005) consider internal auditing simply as existent or non-existent while measuring external auditor influence in a far more comprehensive way (e.g., auditor tenure, type and industry share). The majority of cluster studies remain silent on the role of the IAF.

We conclude that this cluster represents the scientific discourse on internal controls and financial reporting quality that serves as an entry point for research on internal auditing and its effect on internal control quality. We further suggest that cluster number seven is the theoretical underpinning of internal audit studies as a direct consequence of stricter internal control over financial reporting policies. For example, *Auditing Standard No. 5* (PCAOB, 2007), as a central cluster item which provides directions for an external audit of internal controls over financial reporting, contains explanations on the importance of internal auditors as part of the company's internal control environment. We conjecture that this is why co-citations between *AS No. 5* and nine other documents of cluster number three exist. Furthermore, it is telling that all of the 24 co-cited documents of this cluster fall within a period (2004 - 2011) between SOX and the internal audit-related Lin et al. (2011) study. This trend indicates a transition of the topic into core cluster number three which introduces the concept of IAF quality as a determinant of internal control quality (e.g., Gramling & Vandervelde, 2006).

- **Cluster no. 8:** ***Regulatory Framework***

The eighth cluster consists of two central documents that are surrounded by several minor studies. SOX (U.S. Congress, 2002) is both regarding network presence and from a content related viewpoint the most influential source within the analyzed articles. No other item yields co-citation links to every other network cluster and no other document seems to leave its imprint on studies as the federal law does. Several regulatory provisions associated with SOX are of major importance for the emergence of some of the research clusters within the network. The following Sections stand out as they affect multiple network areas:

- Section 201: Services outside the scope of practice of auditors (Cluster 2, 3, 4)

- Section 301: Public company audit committees (Cluster 1 and 5)

- Section 302: Corporate responsibility for financial reports (Cluster 7)

- Section 404: Management assessment of internal controls (Cluster 1, 3, 4, 6, and 7)

- Section 407: Disclosure of audit committee financial expert (Cluster 1 and 5)

As for the second influential cluster item, Frankel, Johnson, and Nelson (2002) provide initial empirical evidence for a positive effect of non-audit fees provided by the external auditor on earnings management. Specifically, the authors find that the former is related to lower financial reporting quality and small earnings surprises.

Two intermediary documents are also included that connect cluster number eight via co-citation links to other clusters of the network. Carcello, Hermanson, and Raghunandan (2005b), as a direct connection to cluster number three, discuss the growing attention for internal auditing in light of recent NYSE and SOX requirements. The authors suggest that large and financially stable companies that face high risks are more likely to invest into internal auditing, and identify factors such as company and inventory size, leverage, operating cash flow and audit committee budget oversight to be significantly related to such investments. The other document (Raghunandan, Rama, & Read, 2001) connects cluster eight to clusters three, one, and five. The study addresses how regulatory guidance affects the interrelationship of audit committees and internal auditors. Empirical evidence is provided that audit committees which are compliant with the *Report and Recommendations of the Blue Ribbon Committee on Improving the Effectiveness of Corporate Audit Committees* (BRC, 1999) interact more frequently with internal auditors and exert more effective oversight than their counterparts. The remaining cluster constituents mostly consist of provisions or guidance from regulators and standard setters that focus on external auditor independence (SEC, 2003c), internal control over financial reporting disclosures (SEC, 2003d), and internal audit outsourcing (IIA, 1994).

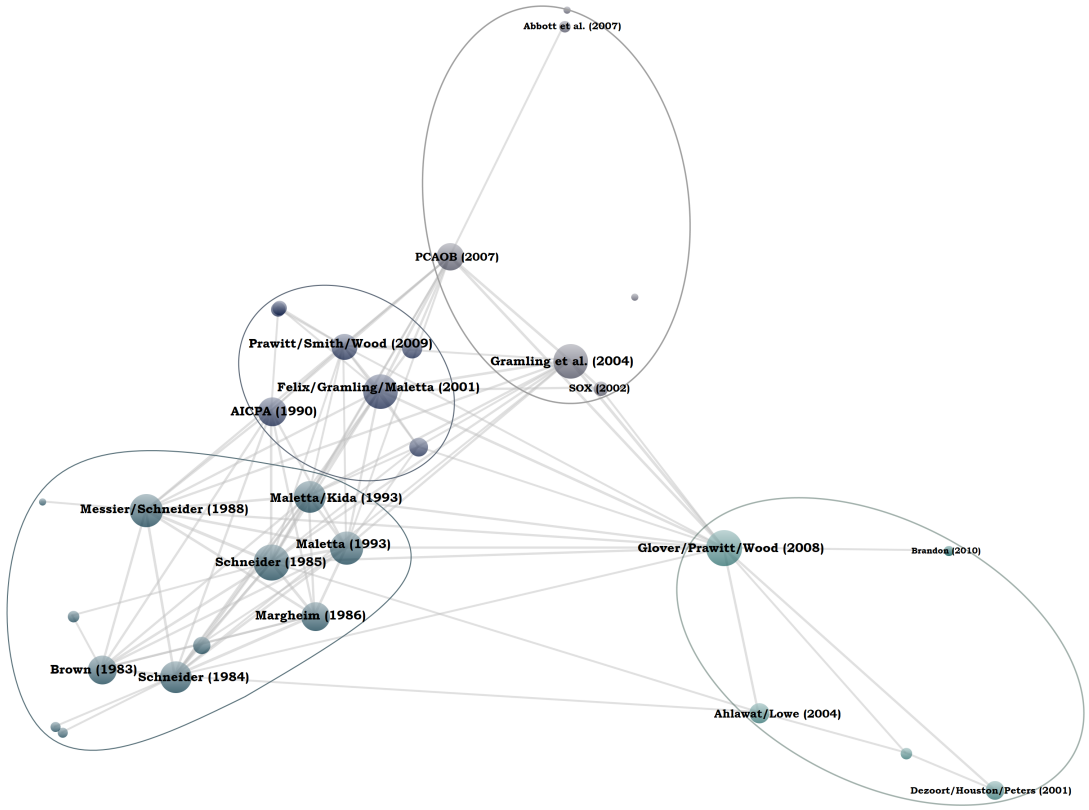
This cluster illustrates how the accounting research community has turned its attention towards internal auditing as a consequence of regulatory developments that often only tangentially or indirectly referred to the IAF. This focus has also brought forward a substantial amount of critical voices regarding some of these reforms and their initiated changes (e.g., Prawitt, Sharp, & Wood, 2012). It is surprising, however, that this discussion does not include more direct firm policies on internal auditing. For example, recent research has shown that an externally directed Internal Audit Report (IAR) positively affects investor confidence regarding oversight effectiveness and financial reporting reliability of firms (Holt & DeZoort, 2009). As research concludes that the existence of an IAF is not directly related to internal control quality (Krishnan, 2005), but that IAFs of high quality positively affect both internal controls and financial reporting quality (Lin et al., 2011; Prawitt, Smith, & Wood, 2009), we note that the disclosure of such information is a potential topic for future research. A recent proposal of the IIA for the 10-K disclosure of four different internal audit quality characteristics substantiates this notion (Chambers, 2009).

Furthermore, the debate of SOX and NYSE listing provisions mostly excluded the controversial withdrawal of a proposed new rule by the NASDAQ which intended to obligate listed firms to establish an IAF. This incident unveiled the skeptical perception prevalent among critics of the IAF, who, as expressed through several comments, perceive internal auditing as a budget-straining burden rather than a value-adding trusted advisor (see Chambers, 2013). Noting that little has been done to investigate the current image of internal auditors inside and outside of their respective companies, we encourage further research on possible reasons for this unfavorable image.

3.4.3 Supplemental analysis

We additionally gathered citation data from 42 articles published in the *Auditing: A Journal of Practice and Theory* (AJPT) journal between 1981 and the end of 2016. We were able to extract 1,388 sources that were cited 1,750 times within the articles. Figure 3.5 shows the network which consists of 33 items which were co-cited at least three times.

Figure 3.5
Co-citation network of internal audit-related articles published in AJPT



Note: The nodes represent 33 highly co-cited documents within internal audit-related articles. A thicker node equals a higher number of co-citations with other items of the network. Links (illustrated as lines) between nodes indicate the number of co-citations of two documents. A thicker link indicates a higher co-citation frequency.

The structural arrangement of documents closely resembles the internal-external audit related clusters (number three and six) that emerged from the five accounting journals. It further coincides with the contents described within these clusters. Outlining the dominant topic within this network, Schneider (1984, 1985) and Messier and Schneider (1988) reveal the importance of the external-internal auditor reliance debate. Additional studies on the outsourcing of internal audit services (Ahlawat & Lowe, 2004; Glover, Prawitt, & Wood, 2008), their influence on the external audit fee or financial statement quality (Felix, Gramling, & Maletta, 2001; Prawitt, Smith, & Wood, 2009), and the general role of internal auditors within corporate governance (e.g., Abbott et al., 2007; Gramling et al., 2004) seem to define the citation-structure of the examined journal articles. Moreover, we note a profound influence of regulations and professional standards, such as SOX and different auditing standards, within the AJPT network.

The co-citation structure of articles published in this specialist journal, therefore, corroborates our findings on the importance of the internal-external auditor relationship within research. The focus of the AJPT-journal on internal and external auditing from a practical and theoretical auditing viewpoint might explain why it only covers two of the initial eight network clusters. Taken together, these findings substantiate our choice of leading accounting journals for the analysis as they provide a broad and meaningful context for internal audit research.

3.5 Directions for future research

Several potential areas of future research emerge in consideration of the co-citation analysis.[18] As for the most distinct observation, examined co-citation patterns unveil the importance of internal audit quality and demonstrate the selected measures to proxy for effective IAFs. It thus seems reasonable to critically reflect upon whether the current quality evaluation concepts (e.g., as constituted by the literature and Statements of Auditing Standards (SAS)) accurately measure internal audit quality. We specifically question whether more indirect measures (e.g., formal and informal CAE ties to the board and senior management, prior work experience or education, fit between internal auditor's attributes and IAF activities, use of technology) partly determine the quality concept. We further conjecture that attitudinal and behavioral factors (e.g., work satisfaction, organizational commitment, intent to leave) play a role in this context. Also, future research could focus on how reporting lines either to senior management or the board promote IAF effectiveness.

Moreover, as a majority of experimental studies stress the importance of the internal-external auditor relationship, we also pose the question whether external quality assessments carried out by an independent party can be a meaningful proxy for high-quality IAFs (e.g., Felix, Gramling, & Maletta, 2001). There should also be clarity as to whether external auditors are more likely to

[18] We provide a comprehensive list of research questions in Appendix 3.D.

rely on independently assessed internal auditors. Furthermore, knowledge is scarce on whether internal auditors benefit from knowledge spillovers during their assistance in external financial statement audits. There should also be more clarity as to which degree of internal-external audit coordination is most favorable.

We encourage future research to contemplate the role of internal auditing in firms that disclose material weaknesses including their remediation and possible consequences for the function (e.g., restructuring, outsourcing or CAE dismissal). To be more specific, internal auditor interaction with the external auditor and audit committees might directly influence the remediation or ex-ante rectification of internal control issues. Also, the introduction of EDP audit tools, such as continuous auditing, might affect internal auditors' activities related to financial statement audits and consequently the quality of reported earnings.

As prior research has pointed out that audit committee oversight of internal auditing promotes activities related to internal controls over financial reporting (Abbott, Parker, & Peters, 2010), we question how IAF subordination to the management-level affects the quality of internal controls. The latter might also be a function of both the structure and processes of the IAF. That is, whether the IAF is in-house or outsourced and uses advanced technology (e.g., continuous auditing or process mining). Also, considering the remarks of Vafeas (2005), it should be investigated whether IAFs of high quality stand in a substitutional or complementary relationship to independent audit committees whose members are financial experts.

Regarding potential synergies of co-operating audit committees and internal auditors, a particular combination of IAF activities and characteristics may be vital in enhancing audit committee effectiveness. For example, Gendron and Bédard (2006) show that audit committee members value internal control-related insights from internal audit reports. It might also be of interest to better understand how audit committee members factor in and evaluate IAF contribution to audit committee issues when reviewing the IAF budget. Further, because interaction with the audit committee is vital much the same for internal as for external auditors, it should be clarified whether close co-ordination between both providers of audit services is a (measurable) constituent of enhanced audit committee effectiveness.

Finally, our study seeks to stimulate the debate regarding the disclosure of internal audit characteristics. Specifically, future research should focus on finding out which internal audit-related information is of interest to financial investors in their evaluation of a potential investment. The public availability of such information might even contribute to improvements in IAF quality within firms. Notwithstanding these potential benefits, detrimental effects of such public disclosures should also be accounted for while it might be necessary to differentiate between both smaller and larger firms.

3.6 Discussion and conclusion

This study offers a unique perspective on internal audit research as a subdomain of accounting research as it provides a holistic overview on different research themes that frequently occur within leading accounting journals. A detailed analysis of 170 research articles and their 6,826 references yielded valuable insights considering the development of the internal audit domain within accounting research.

First, the descriptive part of our study reveals that internal audit research has attracted growing attention in the leading accounting journals between 1926 and the end of 2016. As for possible reasons, the occurrence of several historical events, such as the foundation of the Institute of Internal Auditors or the issuance of the SOX in 2002, can be linked to an increase of publications over time. The results further show that the academic trend towards author collaboration is observable within the internal audit research community. We also provide evidence for the existence of a small core of interconnected researchers who publish more frequently on this topic and receive recognition via consistent citations. We identify three major collaborative groups that presumably are interconnected across a broader set of journals which is why future studies should gather and evaluate more data on authorships within generalist and specialist journals.

Second, as Oler, Oler, and Skousen (2010) suggest that multiple related streams of research such as tax, financial and managerial accounting, and auditing and governance characterize accounting research, we observe that the latter two frame the context of how internal audit research is conducted in the leading accounting journals. In contrast, none of the results suggest a connection between internal auditing and the remaining research areas. This result is remarkable given that managerial accounting research, for example, investigates how accounting information is processed by internal users that are generally affected by the work of internal auditors. It is also telling, in this context, that specialist journals feature a variety of internal audit studies that intersect with these remaining research areas (e.g., Burton et al., 2012; Carcello et al., 2018; Tang, Yang, & Gan, 2017). Moreover, there is a notable scarcity of studies in the leading accounting journals that investigate practices or processes of the function on a micro level. The co-citation structure instead unveils a fragmentation of internal audit research which essentially is defined by internal auditors' usefulness to the external audit process and the audit committee. Specifically, an indirect relevance of internal auditing becomes apparent in the area of internal controls over financial reporting, the effectiveness of audit committees, and the independence of the external auditor. This notion corresponds highly to the conception of the corporate governance mosaic, wherein internal auditing serves as a resource to the external auditor, the audit committee and the board (Cohen, Krishnamoorthy, & Wright, 2004). The network further shows that internal audit quality (competence and objectivity) has emerged as a critical but inconsistent construct within recent publications, of which some have started to introduce internal auditing as a more direct

contributor to the financial reporting quality of a firm.

We thus conclude that internal auditing, through its influence of audit committee oversight and external auditing, indirectly determines financial reporting quality within the accounting research framework. However, recent studies provide evidence for a more direct relationship between the effectiveness of the function and the quality of the financial reporting process which requires further exploration. Also, while the citation network indicates that research agrees on the importance of high-quality IAFs, the frequently proclaimed lack of publicly available information (e.g., on internal audit quality attributes) ultimately inhibits a more profound integration of the function into accounting research. Given that recent insights indicate a growing relevance of such publicly available information to external stakeholders, we hope to encourage researchers, practitioners as well as policymakers to engage in a discussion about the usefulness of internal audit-related information disclosures. Also, it seems necessary to shed light on the actual and future role of internal auditing and to thoroughly scrutinize existing concepts, such as internal audit quality, that prevail within internal audit research.

From a historical viewpoint, the investigation of 170 publications that span roughly nine decades offers insights on the relevance and development of internal auditing's role within accounting research. More importantly, the analysis of each co-citation cluster documents the historical progress, both in terms of context and applied measures, of internal auditing in the leading accounting journals. Considering that co-citation analysis illustrates researchers' formal communication and perception, there is a noticeable transformation of how accounting research has incorporated the topic over time. For example, internal auditors have evolved from a potential source of information during external financial statement audits to assistants who co-ordinate efforts with external auditors (e.g., Lin et al., 2011; Maletta, 1993). Additionally, in the post-SOX era, internal auditing has assumed an influential position within corporate governance research as the quality of the function is related to the quality of the financial reporting process.

As has been stated before, bibliometric analyses present the "evolution of historical connections" that, over a predefined period, are a testimony of the scientific discourse within a field of research (Small, 2003, p. 394). Thus, the method is likely to yield valuable insights when being applied to other scientific (sub-)disciplines.

We are aware that our results are subject to several limitations that provide the basis for a potential follow-up study. A first concern is the consideration of articles in which internal auditing is only of minor importance. This issue was accounted for during the analysis by raising the co-citation threshold for studies to be included in the final network. We further argue that because we are interested in the shape and boundaries of the research field within the accounting journals, narrowing down the approach would result in an exclusion of valuable citation data. Another limitation is that we restrict our analysis to the five leading accounting journals, which consequently leads to the omission of relevant journals from various other (sub-)disciplines (e.g., management

and auditing). We assume that while accounting research represents the most broad spectrum of internal audit topics, other disciplines represent a more specific perspective on internal auditing which would skew the initial findings when included. As a possible solution, we propose that in future studies, additional co-citation networks could be constructed based on specialist journals from other fields to contextualize the insights of this work.

Appendix

3.A Transformational steps

The steps that are required to transform each of the respective symmetric co-occurrence matrices into displayable maps involve:

- Calculation of a similarity matrix which represents the normalized co-occurrence matrix. Normalization is attained by applying a similarity measure which corrects for variations in the number of co-occurrences (c_{ij}) and occurrences (w_i or w_j) of two contained items (*i* and *j*). The similarity measure of choice is the association strength s_{ij} which denotes the relation between the actual occurrence of two items (*i* and *j*) and their expected occurrence. It is calculated as follows:

$$s_{ij} = \frac{c_{ij}}{w_i w_j}. \tag{3.1}$$

- Visual mapping of similarities where an objective function considers each item pair within the similarity matrix and minimizes the weighted sum of their squared Euclidean distances. A higher similarity is implied by a higher weight of squared distances and thereby leads to a closer positioning within the two-dimensional map. The entirety of cited documents or observed authors is arranged in a way that more similar documents or authors are located as close as possible, whereas less similar ones lie more distant from each other within the map. The function, which consists of vectors x_i and x_j (location of item *i* and *j* within the two-dimensional map), and the normed euclidean $||\bullet||$ distances are minimized as follows:

$$V(x_1, ...x_n) = \sum_{i<j} s_{ij} ||x_i - x_j||^2, \tag{3.2}$$

  and is subject to the following constraint:

$$\frac{2}{n(n-1)} \sum_{i<j} ||x_i - x_j|| = 1. \tag{3.3}$$

- Translation, rotation and reflection that involve principle component analysis and median analysis in order to avoid inconsistent results.

3.B Academic affiliations

Table 3.B.1
Most influential academic affiliations

Rank	Academic institution (Sole-authorships / Co-authorships / Co-authorships* / Total)
1	Brigham Young University (1 / 10 / - / **11**)
2	Northeastern University, Boston (- / 10 / - / **10**)
3	Bentley University (- / 4 / 4 / **8**)
4	University of Arkansas (- / 7 / - / **7**)
5	University of Alabama (2 / 4 / - / **6**)
6	University of North Carolina (3 / - / 3 / **6**)
7	University of Kansas (1 / 5 / - / **6**)
8	University of Wisconsin, Madison (- / 6 / - / **6**)
9/10	Santa Clara University (- / 3 / 3 / **6**)
9/10	University of Pittsburgh (- / 3 / 3 / **6**)
11-13	University of Southern California (1 / 4 / - / **5**)
11-13	University of Texas, Austin (1 / 4 / - / **5**)
11-13	Harvard University (1 / 4 / - / **5**)
14/15	University of Alberta (- / 5 / - / **5**)
14/15	Université Laval (- / 5 / - / **5**)
16	University of Florida (1 / 3 / - / **4**)
17-19	University of Manchester, UK (- / 4 / - / **4**)
17-19	University of Massachusetts, Amherst (- / 4 / - / **4**)
17-19	University of Tennessee (- / 4 / - / **4**)
20	Carnegie Institute of Technology (1 / 2 / - / **3**)
	***all co-authors from the same institution.**

Note: Information on author affiliations was collected directly from internal audit-related studies published in leading accounting journals.

3.C Research methodologies

Table 3.C.1
Internal audit research approaches in the top five accounting journals

		(1)		(2)		(3)		(4)		(5)		(6)	
		Experimental		Qualitative		Survey		Archival		Conceptual		Mixed Methods	
		Total	Pct. (%)	Total	Pct. (%)	Total	Pct. (%)	Total	Pct. (%)	Total	Pct. (%)	Total	Pct. (%)
Interval	1926 - 1955	-	-	8	23	3	9	7	20	17	49	-	-
	1956 - 1985	7	16	3	7	3	7	23	51	8	18	1	2
	1986 - 2016	17	19	13	14	11	12	43	48	-	-	6	7
Source	AOS	6	15	7	17	5	12	17	41	-	-	6	15
	CAR	6	20	5	17	4	13	15	50	-	-	-	-
	JAE	-	-	-	-	1	14	6	86	-	-	-	-
	JAR	6	46	-	-	2	15	4	31	1	8	-	-
	TAR	6	8	12	15	5	6	31	39	24	30	1	1
	Total	24	14	24	14	17	10	73	43	25	15	7	4

Note: Information on research methodologies was collected directly from internal audit-related studies published in leading accounting journals.

3.D Research questions

Research Questions:

1. In how far does the current IAF quality evaluation concept (as constituted by the literature and Statements of Auditing Standards (SAS)) truly capture internal audit quality and how can it be expanded? How are more indirect measures such as organizational support for the IAF (e.g., formal and informal CAE ties to the board and senior management, prior work experience or education, fit between internal auditor's attributes and IAF activities, use of technology) related to internal audit quality? What role do attitudinal and behavioral measures (e.g., work satisfaction, organizational commitment, intent to leave) play in this context?

2. Are singular reporting lines either to senior management or the board helpful in promoting IAF effectiveness?

3. How are external quality assessments a meaningful proxy for high quality IAFs as they represent an independent assessment based on the contemporary Statements of Auditing Standards? Are external auditors are more likely to rely on independently assessed internal auditors?

4. Do internal auditors benefit from knowledge spillovers during their assistance in external financial statement audits?

5. What is the role of internal auditing in the case of a material weakness disclosure (including their remediation) and what are the consequences (e.g., restructuring, outsourcing or CAE dismissal) for the function? Do differences for outsourced IAFs exist?

6. How does internal auditor interaction with the external auditor and audit committees influences the remediation or ex ante rectification of internal control issues?

7. How do EDP audit tools such as continuous auditing affect internal auditors' activities related to financial statements and consequently the quality of reported earnings?

8. How does IAF subordination to the management level affect the quality of internal controls?

9. Is there a substitutional or complementary relationship between IAFs of high quality and audit committees whose members are financial experts?

10. Which activities and characteristics of the IAF are perceived as vital in enhancing audit committee effectiveness?

11. How do audit committee members factor in and evaluate IAF contributions to audit committee issues when reviewing the IAF budget?

12. Is a close co-ordination of the external and internal auditor a (measurable) constituent of enhanced audit committee effectiveness?

13. Which internal audit-related information (e.g., within a descriptive Internal Audit Report) is of interest to financial investors in their evaluation of a potential investment? Does the public availability of such information contribute to improvements in IAF quality within firms? Are there detrimental effects of such public disclosures?

3.E List of articles used for the co-citation analysis

Table 3.E.1
List of articles used for the co-citation analysis

Authors	Year	Journal
San Miguel, Shank, Govindarajan	1977	*AOS*
Wilcox, Smith	1977	*AOS*
Charnes, Cooper	1980	*AOS*
Dyckman	1981	*AOS*
Collins	1982	*AOS*
Benston	1982	*AOS*
Libby, Lewis	1982	*AOS*
San Miguel, Govindarajan	1984	*AOS*
Jones	1985	*AOS*
Blocher, Moffie, Zmud	1986	*AOS*
Evans, Lewis, Patton	1986	*AOS*
Simons	1987	*AOS*
Harrell, Taylor, Chewning	1989	*AOS*
Huizing, Dekker	1992	*AOS*
Libby, Luft	1993	*AOS*
Pentland	1993	*AOS*
Power	1997	*AOS*
Carmona, Ezzamel, Gutiérrez	1997	*AOS*
Radcliffe	1998	*AOS*
Rittenberg, Covaleski	2001	*AOS*
Carmona, Ezzamel, Gutiérrez	2002	*AOS*
Covaleski, Dirsmith, Rittenberg	2003	*AOS*
Gendrona, Bédardb	2006	*AOS*
Robson, Humphrey, Khalifa, Jones	2007	*AOS*
Shapiro, Matson	2008	*AOS*
Mennicken	2008	*AOS*
Darnalla, Seol, Sarkis	2009	*AOS*
Suddaby, Gendron, Lam	2009	*AOS*
Arena, Arnaboldi, Azzone	2010	*AOS*
Seifert, Sweeney, Joireman, Thornton	2010	*AOS*

(continued on next page)

List of articles used for the co-citation analysis - continued

Authors	**Year**	**Journal**
Norman, Rose, Rose	2010	*AOS*
O´Dwyer, Owen, Unerman	2011	*AOS*
Norman, Rose, Suh	2011	*AOS*
Bazerman, Moore	2011	*AOS*
Malsch, Gendron	2011	*AOS*
Woods	2012	*AOS*
Morales, Gendron, Guénin-Paracini	2014	*AOS*
Hayne, Free	2014	*AOS*
Fanning, Piercey	2014	*AOS*
Kang, Trotman, Trotman	2015	*AOS*
Christ, Masli, Sharp, Wood	2015	*AOS*
Kang, Trotman, Trotman	2015	*AOS*
Balachandran, Nagarajan	1987	*CAR*
Chung, Lindsay	1988	*CAR*
Messier, Schneider	1988	*CAR*
Wallace, Kreutzfeldt	1991	*CAR*
Balakrishnan	1992	*CAR*
Maletta	1993	*CAR*
Finley	1994	*CAR*
Hansen	1997	*CAR*
Caplan, Kirschenheiter	2000	*CAR*
Dezoort, Houston, Peters	2001	*CAR*
Cohen, Krisnamoorthy, Wright	2002	*CAR*
Felix Jr., Gramling, Maletta	2005	*CAR*
Hay, Knechel, Wong	2006	*CAR*
Gibbins, McCracken, Salterio	2007	*CAR*
Joe, Vandervelde	2007	*CAR*
Glover, Prawitt, Wood	2008	*CAR*
Beasley, Carcello, Hermanson, Neal	2009	*CAR*
Cohen, Krishnamoorthy, Wright	2010	*CAR*
Desai, Roberts, Srivastava	2010	*CAR*
Paterson, Valencia	2011	*CAR*
Lu, Richardson, Salterio	2011	*CAR*
Carcello, Neal, Palmrose, Scholz	2011	*CAR*

(continued on next page)

List of articles used for the co-citation analysis - continued

Authors	**Year**	**Journal**
Johnstone, Li, Rupley	2011	*CAR*
Prawitt, Sharp, Wood	2012	*CAR*
Abbott, Parker, Peters	2012	*CAR*
Baxter, Bedard, Hoitash, Yezegel	2013	*CAR*
Neu, Everett, Rahaman	2013	*CAR*
Fiolleau, Hoang, Jamal, Sunder	2013	*CAR*
Kim, Li, Li	2015	*CAR*
Baber	1983	*JAE*
Ettredge, Simon, Smith, Stone	1994	*JAE*
Villadsen	1995	*JAE*
Ali, Chen, Radhakrishnan	2007	*JAE*
Engel, Hayes, Wang	2010	*JAE*
DeFond, Zhang	2014	*JAE*
Donovan, Frankel, Lee, Martin, Seo	2014	*JAE*
Hoitash, Hoitash, Kurt	2016	*JAE*
Churchill	1966	*JAR*
Lee	1971	*JAR*
Khandwalla	1972	*JAR*
Ashton	1974	*JAR*
Weber	1980	*JAR*
Balachandran, Ramakrishnan	1981	*JAR*
Brown	1983	*JAR*
Schneider	1984	*JAR*
Plumlee	1985	*JAR*
Margheim	1986	*JAR*
Felix Jr., Gramling, Maletta	2001	*JAR*
Kinney Jr., Palmrose, Scholz	2004	*JAR*
Abbott, Daughtery, Parker, Peters	2016	*JAR*
Husband	1926	*TAR*
Lay	1926	*TAR*
Daines	1929	*TAR*
Voss	1930	*TAR*
Kirkham, Gaa	1939	*TAR*
Seidman	1939	*TAR*

(continued on next page)

List of articles used for the co-citation analysis - continued

Authors	**Year**	**Journal**
Harris	1940	*TAR*
Tannery	1942	*TAR*
Staub	1943	*TAR*
Fernald	1943	*TAR*
Anderson	1944	*TAR*
Garbade	1944	*TAR*
Matz	1945	*TAR*
Reves	1946	*TAR*
Boyd	1946	*TAR*
Atkisson	1946	*TAR*
Swayze	1946	*TAR*
Andreae	1947	*TAR*
Andrews	1947	*TAR*
Research Committee	1948	*TAR*
Kohler	1948	*TAR*
Garner	1948	*TAR*
Morey	1948	*TAR*
Child	1949	*TAR*
Bordner	1949	*TAR*
Meigs	1951	*TAR*
Van Voorhis	1952	*TAR*
Kohler	1953	*TAR*
Teitelbaum	1954	*TAR*
Cunningham	1955	*TAR*
Cunningham, Meigs, Reither, Shors, Van Voorhis	1955	*TAR*
Campbell	1955	*TAR*
Haun	1955	*TAR*
Kent	1955	*TAR*
White	1955	*TAR*
Davies	1956	*TAR*
Davidson	1957	*TAR*
Van Voorhis	1958	*TAR*
Campfield	1960	*TAR*
Meigs	1963	*TAR*

(continued on next page)

List of articles used for the co-citation analysis - continued

Authors	**Year**	**Journal**
Zannetos	1964	*TAR*
Bower, Schlosser	1965	*TAR*
Campfield	1965	*TAR*
Churchill, Cooper	1965	*TAR*
Langenderfer, Robertson	1969	*TAR*
Carmichael	1970	*TAR*
Smith, Lanier, Taylor	1972	*TAR*
Morse Jr.	1973	*TAR*
American Accounting Association	1973	*TAR*
Terrell	1974	*TAR*
Sawyer	1975	*TAR*
Stettler	1975	*TAR*
Blakeney, Holland, Matteson	1976	*TAR*
Hardy, Hubbard	1976	*TAR*
Hughes	1977	*TAR*
Burns, Haga	1977	*TAR*
Chambers	1978	*TAR*
Smith Jr.	1978	*TAR*
Uecker, Brief, Kinney Jr.	1981	*TAR*
Wallace	1981	*TAR*
Abdel-khalik, Snowball, Wragge	1983	*TAR*
Penno	1990	*TAR*
Schneider, Wilner	1990	*TAR*
Maher, Tiessen	1992	*TAR*
Maletta, Kida	1993	*TAR*
Kachelmeier, Shehata	1997	*TAR*
Krishnan	2005	*TAR*
Abbott, Parker, Peters, Rama	2007	*TAR*
Bhattacharjee, Maletta, Moreno	2007	*TAR*
Hunton, Mauldin, Wheeler	2008	*TAR*
Prawitt, Smith, Wood	2009	*TAR*
Caskey, Nagar, Petacchi	2010	*TAR*
Masli, Peters, Richardson, Sanchez	2010	*TAR*
Bedard, Graham	2011	*TAR*

(continued on next page)

List of articles used for the co-citation analysis - continued

Authors	**Year**	**Journal**
Shu, Pizzini, Vargus, Bardhan	2011	*TAR*
Jeong-Bon Kim, Song, Liandong	2011	*TAR*
Messier Jr., Reynolds, Simon, Wood	2011	*TAR*
Jans, Alles, Vasarhelyi	2014	*TAR*
Ege	2015	*TAR*

Note: AOS = Accounting, Organizations and Society, CAR = Contemporary Accounting Research, JAE = Journal of Accounting and Economics, JAR = Journal of Accounting Research, TAR = The Accounting Review.

Chapter 4

Breaking the barrier: On the use of joint audits in the internal audit profession

4.1 Introduction

This study investigates factors associated with internal auditors' endeavor to resolve resource constraints through the use of jointly conducted audits. Joint audits between the internal audit function (IAF) and parties from within or outside the organization are an alternate approach to a full IAF outsourcing and long-term additions to the functions' core staff. Potential joint audit partners are external auditors, other external local experts, locally appointed internal auditors or specialist peers from within the organization.

As per the standards of the Institute of Internal Auditors (IIA), the chief audit executive (CAE) is obligated to provide the IAF with the required knowledge, skills, and competencies to meet the designated audit scope and objectives (IIA 2017b). To comply with this obligation, an average of one out of three IAFs uses third party resources according to a recent global IIA practitioner survey (IIARF 2016). Sourcing strategies that promote the appropriateness of IAF resources range from a full outsourcing of the IAF, whereby an external audit provider is responsible for internal audit services, to IAF cosourcing, which combines in-house resources and externally acquired expertise.[1] As an additional source of knowledge, the IIA suggests resorting to the organization's stock of knowledge via audit partnerships with internally recruited guest auditors and other qualified internal assurance providers (IIA 2017b, IIA 2017c, IIA 2017d).[2]

In a related blog post, the IIA's current president Richard Chambers advocated strategies to leverage resources, summarized as relying on the work of others, using functional experts, augmenting the internal audit staff, and external cosourcing (Chambers, 2017). These strategies are also included in the *International Standards for the Professional Practice of Internal Auditing* that urge the chief audit executive (CAE) to "share information, coordinate activities and consider relying upon the work of other internal and external assurance and consulting service providers to ensure proper coverage and minimize duplication of efforts" (IIA, 2007).

In light of these specifications, practitioners (e.g., CIIA 2017) and academics have documented the emergence of a collaborative audit approach that implies an exchange of knowledge and expertise between internal auditors and other assurance parties (e.g., Moore & Hodgson, 1993; Morrill & Morrill, 2003; Sarens, De Beelde, & Everaert, 2009; Simon et al., 2011). During these joint

[1] A related IIA position paper introduces a more nuanced classification of cosourcing. The IIA's classification suggests that internal audit resources are a) obtained externally for specific tasks on an ongoing basis as a partial outsourcing, b) are integrated with external resources in participative joint engagements, or c) are supplemented externally via subcontracting for a specific (proportion of an) engagement and for a limited period of time (IIA 2018, p. 3). The joint audit phenomenon refers to the latter two classifications of cosourcing whereas the former is considered as partial outsourcing in this study.

[2] IIA Practice Advisory 2050-2 classifies assurance providers into individuals who either report to management and/or are part of management, who report to the board (including internal audit), or who report to external stakeholders (e.g., external auditors) (IIA 2009b).

audits, internal auditors reap benefits from additional insights of external auditors or consultants, peers from other functions as well as internal auditors based at remote business entities (Applegate, 1998). Collaborative audits with these internal and external assurance parties have further been identified as an essential driver of internal audit effectiveness in a recent public sector study (Coetzee & Erasmus, 2017).

Yet, practical evidence on internal audit collaboration incentives remains scarce and inconclusive. For example, interviews with CAEs from seven leading multinational organizations suggest that a more trustworthy auditor-auditee relationship or a more efficient audit process are as much of an incentive for collaboration as an increased decentralization of internal audit activities (Protiviti, 2013). Additionally, prior research has been reluctant to address internal audit collaboration but has instead focused on the implications of a partial or full outsourcing of the IAF (e.g., Glover, Prawitt, & Wood, 2008; Prawitt, Sharp, & Wood, 2012; Spekle, Van Elten, & Kruis, 2007; Widener & Selto, 1999). Notwithstanding these issues, the results from a IIA (2015a) *Global Internal Audit Common Body of Knowledge (CBOK) Practitioner Study* indicate a global prevalence of joint audits within the internal audit profession. Our study's primary objective therefore is to contribute to an understanding of the determining factors behind the joint audit phenomenon.

We conduct our analysis using 220 survey responses from chief audit executives who are members of one of the national chapters of the IIA in Austria, Germany or Switzerland. A total of 89 different questionnaire items queried participants about a multitude of topics related to IAF organization, scope of activities, stakeholder relationships, and quality management as well as future trends and challenges of the profession. By consulting previous literature on motives and incentives of IAF resource augmentations, we develop seven comprehensive measures that represent IAF structures and resources, activities and processes as well as environmental factors. Consistent with our expectations, the results of the regression analysis provide evidence that joint audits are more likely to be performed when the IAF focuses on activities related to risk management and strategy-setting. Also, IAFs are more likely to rely on joint audits when being characterized as relatively small while featuring an above median-percentage of certified internal auditors. This observation is particularly relevant given that no such relationship is found for the mere size of the function; rather, it implies that certain firms cultivate a core of internal audit professionals who augment resources via audit partnerships to fulfill the audit plan.

Regarding the audit environment, we further find that the joint audit phenomenon is positively related to both (1) the amount of international challenges internal auditors are confronted with during the audit and (2) the state of decentralization of the IAF. In a second step, we distinguish between different joint audit partners and note that specialist peers are particularly relevant when IAF resources are constrained or when priority is given to risk management activities. External auditors and other external local experts are more likely to join the audit when the traditional IAF scope is expanded or when IAF results are intensively used for the control of strategic processes.

This study is linked and contributes to several recent strands of research. Most importantly, it advances the discussion of internal-external auditor coordination (Felix, Gramling, & Maletta, 2001; Lin et al., 2011) by studying the internal audit setting and, more specifically, the determinants of internal audit resource augmentations. Moreover, as has been noted by academics and practitioners alike, IAFs are more than ever before confronted with a battle for top talent to preserve a high-quality staff and to remain efficient when dealing with increasingly complex business processes (e.g., Burton et al., 2015; McDonald, 2006; Soh & Martinov-Bennie, 2011; Steffee, 2015). We contribute to the related literature by demonstrating the circumstances and instruments CAEs use to evade this requirement of labor supply when limitations in their staffing capabilities occur. This study also extends the common conception of joint audit partners in its consideration of locally appointed internal auditors. Especially in multinational entities, this group is often neglected albeit being an autonomic and frequently consulted resource to internal auditors based at the company's headquarters (Prickett, 2017). Our results consequently facilitate a deeper understanding of innovative alternatives to traditional internal audit staffing approaches and uncover solutions to recurring challenges of the profession. As several studies have focused on the organizational determinants of investments into the IAF and its size (Barua, Rama, & Sharma, 2010; Carcello, Hermanson, & Raghunandan, 2005b), this research, in contrast, contributes by focusing on IAF-related determinants of augmentation strategies that prevent additional staffing investments.

The outcomes of this study are especially relevant to standard setters as our results complement recently promulgated IIA standards, guidance and position papers that refer to the practice of internal auditor coordination and reliance on other internal and external providers of assurance (IIA, 2007, IIA 2017b, IIA 2017c, IIA 2017d). Internal audit practitioners benefit from the insights provided as the research explores IAF structures and task-related factors that induce a dynamic resource augmentation approach which differs from traditional methods prevalent within the profession (e.g., outsourcing, staff recruitment). The study is also useful for external auditors and comparable external experts as it highlights the circumstances behind internal auditors' decision to turn towards their services.

The remainder of this chapter is organized as follows. Section 4.2 briefly reviews the current literature on the topic and develops the hypotheses preliminary to our statistical model. Section 4.3 goes into detail on the data collection process and discusses the research design. Section 4.4 then presents the findings of the study and is followed by a conclusion in section 4.5.

4.2 Literature review and hypotheses

The term joint audit has been used in varying contexts in recent auditing research. An extensive stream of literature has sought to understand the quality implications of an external joint audit, wherein two independent external audit firms are appointment to jointly opine on the client's financial statements (e.g., André et al., 2016; Deng et al., 2014; Francis, Richard, & Vanstraelen, 2009). A smaller amount of studies refers to joint audits as coordinated audit efforts of internal and external auditors with the aim to increase both audit coverage and efficiency (Felix, Gramling, & Maletta, 1998; Morrill & Morrill, 2003; Ruud, 2003, p. 87). An important caveat in this setting is the prevalent adoption of the external auditor's viewpoint when potential outcomes are being considered. For example, Abbott, Parker, and Peters (2012b) and Pizzini, Lin, and Ziegenfuss (2015) find internal-external auditor coordination alongside direct IAF assistance to be negatively related to the time external auditors require to complete financial statement audits.[3] Also, closer collaboration with the external auditor is found to positively affect internal auditors' contribution to external audits when inherent client risk is comparatively high while also leading to lower costs of the external audit (Felix, Gramling, & Maletta, 2001; Zain, Subramaniam, & Stewart, 2006).

A separate strand of research has examined the internal auditors' perspective by subsuming collaborative audits between internal auditors and other assurance parties under the joint audit category (Barrett, 1996; Moore & Hodgson, 1993; Sarens, De Beelde, & Everaert, 2009; Wood & Wilson, 1988). However, most of this literature presents a fragmented picture with studies focusing mostly on the outcomes rather than the antecedents of professional collaboration. An IIA position paper on IAF staffing considerations provides proper guidance on this matter as reasons for resource augmentations are broadly outlined as "temporary staff shortages, specialty skill needs, coverage for remote business locations, local language needs, special project work, and supplemental staff to meet tight deadlines" (IIA 2018, p. 3). The paper further refers to small organizations with limited access to fulltime internal audit personnel as being reliant upon additional resources. This suggests an increased adoption of joint audits in international contexts, where scarcities of both specialized competencies and resources prevail. We introduce the theory of team boundary spanning to examine the central motives and outcomes that are related to collaborative audit efforts of the IAF in an international environment.[4]

However, prior research on the determinants of joint audits in an internal audit setting is scarce, whereas recent studies focus on the partial or complete outsourcing of internal auditing and its effect on fraud prevention (James, 2003; Prawitt, Sharp, & Wood, 2012), perceived external auditor

[3] Coordination in the external audit setting commonly ranges from plain coexistence of internal and external auditors to the integration or coordination of activities and culminates in a partnership between both parties.

[4] A comprehensive overview of the conceptual model tested in this chapter is provided in Figure 4.1. The Figure is placed at the end of section 4.2.

independence and audit fees (Abbott, Parker, & Peters, 2012a; Lowe, Geiger, & Pany, 1999; Swanger & Chewning Jr, 2001) or external auditors' reliance on the IAF (Brandon, 2010; Davidson, Desai, & Gerard, 2013; Desai, Gerard, & Tripathy, 2011). Despite the comprehensively studied factors which frame the decision-making process of IAF outsourcing, there is a lack of research devoted to IAF attributes and practices that induce a collaborative joint audit approach.[5]

4.2.1 Internal audit structure and resources

The amount of available IAF resources is commonly used as a surrogate for internal audit quality (Abbott et al., 2016; Ege, 2015; Ge & McVay, 2005). For example, when considering the reliance on internal auditor's work or assistance, external auditors need to assess internal audit quality factors related to the size of the IAF (AICPA, 2014). This notion is consistent with the official internal audit standards that require the CAE to "[...] ensure that internal audit resources are appropriate, sufficient, and effectively deployed to achieve the approved plan" (IIA, 2007). Numerous studies have scrutinized different company characteristics associated with investments into IAF resources and have emphasized the importance of audit committees as a monitor for the internal audit budget (Anderson et al., 2012; Barua, Rama, & Sharma, 2010; Carcello, Hermanson, & Raghunandan, 2005b; Goodwin-Stewart & Kent, 2006). However, none of these studies have considered how IAF resources intertwine with shared audit efforts of different assurance parties.

The resource-based view of the firm yields a possible explanation in its assumption that a firm's competitive advantage is attained through the cultivation of a firm-idiosyncratic resource portfolio which is contingent upon inimitable "core competencies" (e.g., Barney, 1991). These core competencies aim to inhibit rivalry imitation and outpacing. Teece, Pisano, and Shuen (1997) refine the significance of competitive "core competencies" by introducing the concept of dynamic capabilities as "the firms' ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments" (see Teece, Pisano, & Shuen, 1997, p. 516). The outperformance of competitors thus is closely associated with the coordination and combination of the firm's existing knowledge assets. Transferring the concepts of core competencies and dynamic capabilities to the field of human resource management, Lepak and Snell (1999) develop a sophisticated framework which models a highly functional and hybrid workforce. Characterized by a core of skilled personnel which is augmented via short-term sourcing arrangements and inter- or intra-company collaboration, this workforce not only reduces long-term employment costs but also facilitates a spillover of specialized knowledge and value creation from human capital.

This cultivation of core competencies resonates with prior research on IAF resource augmen-

[5] Investigated factors which influence a partial or complete IAF outsourcing are audit committee oversight, available auditor skill sets, firm size, and demand for firm-specific knowledge together with organizational integration (Abbott et al., 2007; Abdolmohammadi, 2013; Spekle, Van Elten, & Kruis, 2007; Widener & Selto, 1999).

tation. Prior research indicates that "hybrid" IAFs often consist of a professional core of auditors that is supplemented by additional sources of specialized knowledge (Anderson et al., 2010; Selim & McNamee, 1999, p. 61). Such a structural approach is illustrated more succinctly in a public sector case study conducted by Getie Mihret and Wondim Yismaw (2007), who document how a core of proficient, well-trained internal auditors is supplemented by short-term personnel with limited technical skillsets and experience. McDonald (2003) advises a similar approach in the establishment of a value-oriented and proactive IAF. The author suggests the acquisition of supplemental expertise from either inside or outside of the organization to complement the skill sets of experienced and internally "groomed" full-time professionals (McDonald, 2003, p. 50). This is in line with Prawitt (2003) who notes that the process of effective audit planning includes the "insourcing" of specialized knowledge from within the sphere of the organization (see Hubbard, 2000; Prawitt, 2003, p. 175).

Additional sources further support the view that collaborative partnerships are a central cornerstone of these small but effective IAFs (e.g., Hodge, 2019; Kastenschmidt & Watts, 2015; Yevlanova, 2018). For example, Yevlanova (2018) reports that the cooperation with experts from other departments, external auditors and regulators provides smaller functions with specialized expertise and experience as well as access to best practices. Chambers (2011) adds that small-sized IAFs benefit from enhanced credibility and technical knowledge, reduced audit cycle times, and maintained objectivity when resorting to joint audit engagements. Also, cross-disciplinary partnerships can be a practical means of improving internal auditors' understanding of operational processes and risks when they are part of a newly founded IAF (Hodge, 2019, p. 32).

Based on the above deliberations, we posit the following hypotheses:

$\mathbf{H}_{1_a}$: The size of the internal audit function is negatively associated with joint audits.

$\mathbf{H}_{1_b}$: Small internal audit functions that exhibit relatively high levels of proficiency are positively associated with joint audits.

4.2.2 Internal audit scope and activities

Several studies conducted in the post-SOX era suggest that an increase of non-traditional activities puts a strain on IAF capacities (Chambers & Odar, 2015; Jackson, 2007; Sanglier, 2015).[6] Hass, Abdolmohammadi, and Burnaby (2006) consider regulatory changes as well as wide-ranging stakeholder demands as reasons for this increase; adding that resource augmentations are a vi-

[6] The spectrum of internal audit services is by definition of the IIA distributed across the areas of governance, risk management, and internal controls (IIA, 2007). Other common roles include fraud prevention and regulatory compliance (Burnaby & Hass, 2009).

able response to ensuing capacity constraints (also Ruud, 2003, p. 87). The authors further note that the traditional role of internal auditing is challenged by the emergence of enterprise risk management.[7] Over time, internal auditors have transitioned to one of the main protagonists of this holistic approach to risk monitoring due to their experience in strategic risk mapping and internal control assessment (Arena, Arnaboldi, & Azzone, 2010; Hayne & Free, 2014). This transition is paralleled by a growing allocation of internal audit resources to strategy and risk management activities (Matyjewicz & D'Arcangelo, 2004).

However, the holistic evaluation of organizational risk management processes requires profound skills and competencies. For example, internal auditors are expected to be knowledgeable about key business risks and should "understand corporate governance requirements; have project management, analytical and facilitation skills[...]" (IIA 2009a, p. 6). Without these traits, members of the IAF are discouraged from assuming a strong assurance role within enterprise risk management unless expertise is brought in from other sources. Correspondingly, IIA (2009b) *Practice Advisory 2050-2* advises internal auditors to rely on other assurance providers to "[...] assess specialty areas outside of the internal audit activity's expertise or to enhance risk coverage beyond the internal audit plan". Internal audit collaboration thus not only serves to improve IAF resources quantitatively but ensures adherence to professional guidelines in the area of strategy and risk management.

This is in line with prior research indicating that internal audit partnerships are related to activities in the area of strategy and risk management (e.g., Allegrini & D'Onza, 2003; Cathcart & Kapoor, 2010; Fraser & Henry, 2007). Fraser and Henry (2007) illustrates the entrenchment of joint engagements in the context of risk assurance:

> "We have operational people, who have experience of the risks within the business. I have got the archetypal internal auditor who has been there all his life and whose nose is better than any ferret's[...]When I go to China I will pull out a controller of a business because he lives in Hong Kong and speaks Mandarin. We supplement our resource by having support people (IA)." [Internal auditor - Case A]

Considering potential outcomes, Steinbart et al. (2018) demonstrate that internal audit collaboration in the area of information security positively affects the detection and prevention of information security issues. The authors attribute this to a realization of collaborative synergies,

[7] The goal of enterprise risk management is to align risk management processes with business strategy and objective-setting. The Committee of Sponsoring Organizations of the Treadway Commission (COSO) defines enterprise risk management as "[...] a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives" (COSO, 2004, p. 2).

whereby internal auditors benefit from improved risk-detection capabilities while similarly raising the risk awareness of information security functions. This is confirmed by Yevlanova (2018) who argues that close interaction between internal and external auditors or other external experts allows internal auditors to be aware of emerging internal control risks and to internalize best practices.

Overall, previous literature suggests that the joint audit setting is especially relevant when IAFs operate in areas such as risk and strategy management. Also, given the broadened range of responsibilities, IAFs seek to extend the existing pool of capabilities by means of cooperation.

Stated formally:

$\mathbf{H}_{2_a}$: Responsibilities beyond the IAF's traditional scope are positively associated with joint audits.

$\mathbf{H}_{2_b}$: A stronger internal audit focus on risk management-related activities is positively associated with joint audits.

$\mathbf{H}_{2_c}$: The importance of activities that are relevant to the board's control of strategic processes is positively associated with joint audits.

4.2.3 Environmental factors

In a multinational context, corporations are frequently exposed to a host of infrastructure-related and country-specific risks, increasing the need for monitoring mechanisms and greater management oversight.[8] Given that these risks are amplified by the degree of subsidiary remoteness, managers often face challenges related to different cultural values, language barriers, and peculiarities inherent to the legal and political environment (Johnson, Lenartowicz, & Apud, 2006). As a direct response, company headquarters exert control over geographically dispersed subsidiaries through an array of bureaucratic control (e.g., codified rules and regulations) and rather informal cultural (e.g., training, socialization by use of expatriates and rotational human resource programs) coordination mechanisms (Baliga & Jaeger, 1984).

Hutzschenreuter and Voll (2008) find evidence for a negative relationship between international expansions and the level of firm profitability when cultural differences between the host and home country are increasingly diverging. Additional insights show that the use of integrative formal control mechanisms, such as global policies to harmonize human resource practices between headquarters and subsidiaries, further exacerbate this relationship (Lazarova, Peretz, &

[8] Extant studies have developed the notion that complexity (i.e., decentralization of activities) on both firm and internal audit level is associated with a greater need for auditing capacities (Goodwin-Stewart & Kent, 2006; Gronewold & Heerlein, 2009; Hay, Knechel, & Wong, 2006; Wallace & Kreutzfeldt, 1991).

Fried, 2017). An opposite tendency is documented for informal personnel-related coordination mechanisms (e.g., relying on liaison personnel, temporary task forces, and permanent teams) that serve as information conduits between organizational entities and reduce knowledge asymmetries or cultural barriers (Duan, Nie, & Coakes, 2010; Easterby-Smith, Lyles, & Tsang, 2008; Gupta & Govindarajan, 2000).

Zhao and Anand (2013) introduce such an informal coordination mechanism with the concept of "boundary spanners", referring to organizational members operating at the periphery or boundary of an organization. More specifically, the authors define boundary spanners as "[...] representatives from the source unit or well-trained members of the recipient unit who have broad relations with various experts in the source unit or supervisors. They act as information and knowledge hubs, receiving information, questions, answers, and suggestions from the members of one unit, as well as processing, filtering, translating and feeding them to the members of the other unit" (Zhao & Anand, 2013, p. 1518). In a principal-agent setting, members of an IAF located at headquarters often assume this boundary spanning role given their transmission of decentralized information as well as their verification of intra-organizational policy conformance.

Relatedly, collaborating with local experts during the audit as a boundary-spanning strategy (e.g., Marrone, 2010, p. 914) promotes auditors' understanding and knowledge of a subsidiary's knowledge system (e.g., tacit knowledge and cultivated habits encoded by the organizational unit's cultural environment). For example, the assistance of multilingual natives or expatriates improves cross-cultural communication by mitigating language barriers between the home and host country (Marschan-Piekkari, Welch, & Welch, 1999). Using these intermediaries during the audit, therefore, expedites the process of gathering and interpreting relevant information. Potential intermediary audit partners are locally appointed auditors (e.g., expatriate or foreign native internal auditors assigned to a decentralized internal audit unit), local peers with task-specific expert knowledge (e.g., assurance providers or members of other operational business units) as well as external auditors or similar external experts (e.g., Arena, Arnaboldi, & Azzone, 2006; Boyacigiller, 1990; D'Cunha, 2013; Jackson, 2008; Lindow & Race, 2002; Sarens, De Beelde, & Everaert, 2009; Smith, 2002).

A decentralized structure of the IAF, which manifests itself through regional hubs or local audit departments close to the relevant organizational units, further alleviates the loss of managerial control while also fostering the dialogue between the IAF and employees of the local entity.[9] Hogan Hayes (2018) summarizes potential benefits of a decentralized IAF structure as a) a facilitated collaboration between members of the IAF and regional management, and b) a profound

[9] The effect of cultural dimensions and related challenges on the auditor-auditee relationship is subject to the study by Woodworth and Said (1996), who point out the responsibility of managers to take adequate precautions in instances where culture-specific traits negatively affect the quality of an audit.

knowledge of business-related key risks and controls due to internal auditors' proximity to operational processes.

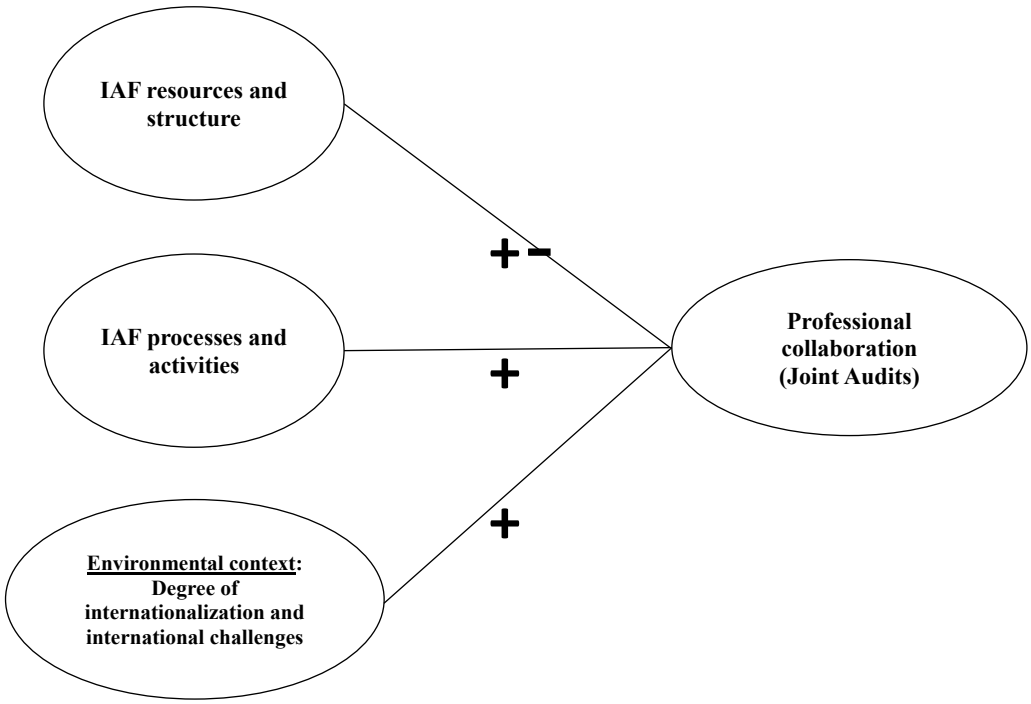
Thus, in consideration of the IAF environment, collaboration motives are twofold as both the degree of internationalization of the IAF as well as the presence of cultural challenges arising in a multinational setting seem to be initiating factors of the joint audit phenomenon. As internal auditors pursue the mission of being the "window into the whole company" (Tapestry Networks, 2004) they are regularly delegated the role of a critical trustee of headquarters to maintain adequate supervision and to assess the local control environment.

Consequentially, we posit the following hypotheses:

$\mathbf{H}_{3_a}$: The degree of internationalization of the internal audit function is positively associated with joint audits.

$\mathbf{H}_{3_b}$: The degree of audit challenges related to the firm's internationalization is positively associated with joint audits.

Figure 4.1
Conceptual model



4.3 Research method

Our data is obtained from a comprehensive web-based survey of 1,916 chief audit executives (participants had to be invited to take part) in Austria, Germany, and Switzerland. The respective IIA chapters from these countries were actively involved in the development process of the survey. Before its release, the questionnaire was extensively pretested with the help of nine CAEs from different organizations. Participation in the final survey was contingent upon the premise of anonymity and confidentiality making it impossible to identify any person or affiliated organization. Our sample is therefore restricted to survey replies and cannot be supplemented by alternative sources of data (e.g., financial reporting). Despite geographical proximity and the fact that both regulatory governance requirements and cultural factors (e.g., German as the primary language) signify common traits, country effects are accounted for in our statistical results. The survey consists of more than hundred questions ranging from topics related to IAF organization, the scope of activities, stakeholder relationships, and quality management to future trends and challenges of the profession. The final questionnaire yielded 415 responses (equals a response rate of 21.6 percent) of which 220 questionnaires could be used to cover both the variables derived from our hypotheses and additional control variables.

4.3.1 Dependent measures

To test our hypothesis, we construct a dichotomous variable (Joint_Audits) which assumes a value of 1 if the IAF performs joint audits with one or more of the following parties: external auditors and/or other external local experts, regulators, locally appointed internal auditors, specialist peers from other functions, and equals 0 otherwise.

In a supplemental analysis, we break down our dependent variable into three dichotomous variables (JA_Ea, JA_Local_Ia, JA_Peer) each capturing whether the IAF performs joint audits with one of the aforementioned parties (external auditors and/or other external local experts, locally appointed internal auditors, specialist peers from other functions).[10]

4.3.2 Independent measures

To test both parts of our first hypothesis (hypotheses $H_{1_{a-b}}$), we measure three different variables related to IAF structure and resources. Our first variable consists of the natural log of total internal auditors, as a full-time equivalent, working for the organization (Log_IAF_Size). Our second variable reports on the relative proportion of Certified Internal Auditors within the IAF and ranges

[10] We omit the group of regulators because only two respondents in our sample indicated that joint audits with regulators take place.

from 0 to 100 (CIA_Perc). To test the second part of our first hypothesis, we perform two median splits on the relative size of the IAF (measured as the ratio of IAF size per 1,000 employees (consistent with Anderson et al., 2010)) and the proportion of CIAs prevalent within the IAF. This allows for a differentiation both between relatively well and under-resourced IAFs and those IAFs which exhibit relatively high or low levels of competence (hypothesis H_{1_b}). Consequently, our dichotomous variable assumes a value of 1 if (a) the indicated ratio of IAF size per 1,000 employees lies below the reported sample median, and (b) the percentage of CIAs prevalent within the IAF lies above the sample median, and equals 0 otherwise (Resource).

Two control variables were included to account for structural and resource-related peculiarities. Because the IIA mandates internal auditors to document their responsibilities in an audit charter which acts as a safeguard for independence and objectivity in the joint audit setting (IIA 2009a), we construct a dichotomous variable which takes on the value of 1 if the company management approves the IAF's objectives and tasks in writing (e.g., in an "audit charter" or in an "Internal Audit guideline"), and 0 if otherwise (Charta). Because organizations might pursue alternative strategies to reduce costs or leverage knowledge (e.g., Carcello, Hermanson, & Raghunandan, 2005b), we also include a continuous variable which represents the average amount of internal audit staff capacity (in man-years) that has been partially outsourced (Outsource).[11]

In a next step, we measure variables intended to represent processes and activities of the IAF that incentivize the use of joint audits (hypotheses $H_{2_{a-c}}$). First, we construct a binary measure that assumes the value of 1 if the IAF has other functions besides traditional audit activities, and equals 0 if otherwise (Scope_Expand). Other functions are defined as compliance, data security, quality management, legal, and risk management or controlling.

Second, participants were asked to indicate on a five-point Likert scale (ranging from a minimum value of 1 (does not apply) to a maximum value of 5 (applies)) whether the IAF currently pursues the objective of ensuring risk management effectiveness (Risk_Mgmt). We also measure on a six-item scale to what extent IAF results are used for the control of strategic processes, where a value of 0 denotes "never", and a value of 5 denotes "very often" (Strategic_Control).

To measure environmental factors which frame the environmental setting of joint audits (hypotheses $H_{3_{a-b}}$), we construct a composite measure comprising three different questions that surrogate for the concept of structural IAF internationalization. Questions on the number of international IAF hubs (i.e., decentralized internal audit locations), number of auditors with a permanent workplace in a foreign country, and number of auditors with a foreign nationality were transformed to relative measures (foreign hubs divided by total number of internal audit units; expatriates and

[11] In an additional question, participants were asked to state whether their IAF was entirely outsourced to an external party (e.g., the external auditor), however, none of the participants indicated that internal audit services were entirely outsourced to any external parties.

foreign natives divided by total number of internal auditors) exhibiting high levels of internal consistency (standardized Cronbach's Alpha of 0.8816). Applying principal component analysis allows us to validate this notion of internal consistency and to derive our composite measure from the predicted component scores of the analysis (IAF_Decentral). Components had an Eigenvalue above 1 and explained 82.5 percent of the variables' variation.

Additionally, we measure the extent of environmental challenges internal auditors are confronted with in an international context by composing a cumulative score based on responses from five different questions. Participants were asked to indicate whether challenges in their international environment existed and could choose from five possible options (cultural understanding of the host country, cultural distance to the audited entity, language of the auditor, language of local employees/organizational entities, knowledge about local laws/regulations). For each international challenge, we assign a score of 1 to respondents while the sum of each participants' score results in our composite measure which takes on a minimum value of 0 and a maximum value of 5 (Int_Challenges).

Finally, we control for a small array of organizational characteristics.[12] We introduce a more nuanced approach to measure the degree of internationalization by constructing a dichotomous variable which assumes the value of 1 if the organization's proportion of foreign sales ranges between 1 and 50 percent, and equals 0 otherwise (Foreign_Sales50). Because high levels of internationalization incentivize IAF outsourcing, we conjecture that moderate levels of organizational internationalization are more likely to be conducive to the somewhat symbiotic joint audit phenomenon but refrain from stating a more explicit assumption. We include a dummy variable which takes on the value of 1 if the organization operates in the financial sector, and 0 if otherwise (Finance). We also measure whether the organization is listed on a national stock exchange and include a dichotomous variable that assumes the value of 1 if the organization is listed, and equals 0 if otherwise (Listed). Furthermore, two dichotomous variables were added to capture and control for country effects (Country Effects). We do not provide predictions for any of these variables.

[12] Abdolmohammadi (2013), in a study on organizations located in Australia, Canada, New Zealand, South Africa, the U.K./Ireland, and the U.S., finds partial evidence that international/multinational organizations tend towards IAF outsourcing.

4.3.3 Model specification

The following regression equation was used to test our main hypotheses:

$$\begin{aligned}\text{Joint\_Audits} = \alpha &+ \beta_1 \text{Log\_IAF\_Size} + \beta_2 \text{Resource} + \beta_3 \text{Charta} + \beta_4 \text{Outsource} \\ &+ \beta_5 \text{Scope\_Expand} + \beta_6 \text{Risk\_Mgmt} + \beta_7 \text{Strategic\_Control} \\ &+ \beta_8 \text{IAF\_Decentral} + \beta_9 \text{Int\_Challenges} + \beta_{10} \text{Foreign\_Sales50} \\ &+ \beta_{11} \text{Finance} + \beta_{12} \text{Listed} + \beta_{13-14} \text{Country Effects} + \varepsilon.\end{aligned} \tag{4.1}$$

4.4 Results

4.4.1 Descriptive results

Descriptive statistics on the size distribution (based on total employees) of included organizations are provided in Table 4.1. The size pattern indicates a high variation with 145 (about 66 percent) organizations falling in the range of fewer than 5,001 employees and 52 (about 23 percent) organizations with an employee headcount of more than 10,000.[13] The average firm size within our sample is 18,025 with a standard deviation of about 55,624. This indicates sample representativeness for larger organizations although strong variation has to be accounted for.[14]

Table 4.2 presents descriptive statistics for both organizational and IAF-related variables used in our equation. The mean (median) IAF in our sample is staffed with 16.7 (6) auditors (IAF_Size) and consists on average (median) of 23.7 (10.5) percent of auditors who possess a CIA certification (CIA_Perc).[15] Moreover, the quartiles (3, 6, 15) and maximum value (550) of total IAF employees (IAF_Size) signify variable skewness which is why we use the natural log in our final regression equation (Log_IAF_Size).

Our measure on the use of an audit charter or other written documentation of an approved audit plan has a mean of roughly one (0.95), implying a tendency towards broad standard compliance by IAFs utilizing this independence ensuring mechanism (Charta). In an additional analysis, we

[13] A strong sample disparity between organizations positioned at the top and bottom end of the employee distribution is noticeable, revealing two organizations with a total headcount of three and one organization with a total headcount of 600,000. However, when winsorizing both the top and bottom organization-employee observations from the sample, our inferences from the statistical results remain unchanged.

[14] The average number of employees changes to 15,509 when winsorizing both the top and bottom organization-employee observations which implies consistency when comparing the two sets of data.

[15] The correlation values provided in Table 4.B.1 indicate multicollinearity (0.6, p-value = 0.000) between our measure for CIA percentage (CIA_Perc) and our proxy for comparatively small and competent IAFs (Resource). We therefore exclude CIA_Perc from our regression model. However, when including CIA_Perc in our model, our results remain unaffected.

Table 4.1
Sample distribution: Total firm employees

Employees	No. respondents	% of respondents
1,000 or less	67	30.45
1,001 to 2,000	41	18.64
2,001 to 5,000	37	16.82
5,001 to 10,000	23	10.45
10,001 to 20,000	20	9.09
20,001 to 50,000	13	5.91
50,001 to 100,000	7	3.18
more than 100,000	12	5.45
Total	220	100
Mean	18,025.11	
Std. Dev.	55,624.36	
Min	3	
Max	600,000	

find that 213 (about 97 percent) of all respondents are members of a national IIA chapter which overall suggests a reasonable level of IAF professionalization and practice harmonization. Also, outsourcing of internal audit services is a scarcely used tool by IAFs as demonstrated by an average (median) of 0.6 (0.0) person/years per year (Outsourcing). The average values for both Risk_Mgmt (3.8) and Strategic_Control (2.4) are indicative of a substantial deployment of internal audit services in the areas of risk management and strategic control. Moreover, IAFs exhibit marginal levels of decentralization as suggested by an average (median) of 15.0 (0.0) percent of decentralized IAFs (Perc_Foreignloc), 9 (0.0) percent of internal auditors permanently staffed in a foreign entity (Perc_IAforeign), and 14.3 (0.0) percent of auditors with a foreign nationality (Perc_IAnatforeign).

To add a more nuanced dimension to these findings, we perform inter-group comparisons and find that, despite the prevalence of marginal levels of overall IAF decentralization, IAFs using joint audits exhibit on average comparatively high levels of decentralization (see Table 4.3). Mean differences suggest that IAFs which rely on temporary audit partners display higher average proportions of international units (difference 15.8 percent) and internal auditors permanently affiliated with a foreign subsidiary (difference 11.0 percent), and tend to feature a higher share of internal auditors with a foreign nationality (difference 12.1 percent). Mean differences are significant at the one percent level (two-tailed $p < 0.001$, variances are assumed to be unequal).

Table 4.2
Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max	P25	P50	P75
JA	220	0.623	0.486	0.000	1.000	0.000	1.000	1.000
Log_IAF_Size	220	1.926	1.191	0.000	6.310	1.099	1.792	2.708
IAF_Size (total)	220	16.718	44.164	1.000	550	3.000	6.000	15.00
CIA_Perc	220	23.736	29.091	0.000	100	0.000	10.50	33.15
Resource	220	0.327	0.470	0.000	1.000	0.000	0.000	1.000
Charta	220	0.945	0.228	0.000	1.000	1.000	1.000	1.000
Outsource	220	0.618	1.693	0.000	20.00	0.000	0.000	1.000
Scope_Expand	220	0.341	0.475	0.000	1.000	0.000	0.000	1.000
Risk_Mgmt	220	3.814	1.281	1.000	5.000	3.000	4.000	5.000
Strategic_Control	220	2.382	1.250	0.000	5.000	1.000	2.000	3.000
IAF_Decentral	220	0.011	1.612	-0.920	5.895	-0.920	-0.920	0.284
Perc_Foreignloc	220	0.150	0.287	0.000	0.972	0.000	0.000	0.000
Perc_IAforeign	220	0.090	0.201	0.000	0.913	0.000	0.000	0.000
Perc_IAnatforeign	220	0.143	0.235	0.000	1.000	0.000	0.000	0.236
Int_Challenges	220	1.445	1.456	0.000	5.000	0.000	1.000	3.000
Foreign_Sales50	220	0.386	0.488	0.000	1.000	0.000	0.000	1.000
Finance	220	0.318	0.467	0.000	1.000	0.000	0.000	1.000
Listed	220	0.441	0.498	0.000	1.000	0.000	0.000	1.000

Note: Variables are defined in Appendix 4.A.

The descriptive results further reveal that average IAFs in the sample encounter about one challenge in an international context (average of 1.5, median of 1.0) which is related to the cultural

Table 4.3
Decentralization of joint audit adopting versus non-adopting IAFs

	Joint Audits = 1	**Joint Audits = 0**		
Variable	**Mean** (n = 137)	**Mean** (n = 83)	**Mean diff.**	**Pr**($\|\mathbf{T}\| > \|\mathbf{t}\|$)
Perc_Foreignloc	0.210	0.052	-0.158	0.000
Perc_IAforeign	0.132	0.022	-0.110	0.000
Perc_IAnatforeign	0.188	0.067	-0.121	0.000

Variables are defined in Appendix 4.A.

understanding of the host country, cultural distance to the audited entity, language of the auditor, language of local employees or organizational entities, or knowledge about local laws and regulations (Int_Challenges). Finally, organizations included in the sample exhibit reasonable degrees of variation in control measures that are being used to proxy for organizational characteristics (Foreign_Sales50, Finance, Listed).

4.4.2 Tests of the conceptual model (joint audits)

Table 4.4 reports the results of the multivariate analysis based on our dichotomous Joint_Audit outcome variable. The logistic regression model is significant ($p < 0.001$) and the R^2 is 22.5 percent.[16]

We find that the coefficient on Log_IAF_Size is negative with a p-value (coefficient) of 0.608 (-0.098), suggesting that joint audits are not associated with IAF size per se (hypothesis H_{1_a}). Our second variable (Resource) provides a more subtle IAF resource measurement as it captures information on relatively small-sized IAFs with relatively high degrees of competence. The variable coefficient is positive and significant at the five percent level (Resource 0.805**) which supports our second hypothesis H_{1_b} on IAFs' tendency to supplement a professionalized core of internal auditors with specialized and task-specific expertise.[17] For the control variables, both coefficient signs of our proxies for written approval of the audit plan and IAF outsourcing are in line with our expectations but show no signs of statistical significance (Charta 0.845, Outsource -0.047).

Regarding our hypotheses on internal audit activities and processes, we find that both coefficients on Risk_Mgmt and Strategic_Control are significantly positive on the five percent level (0.274**, 0.356**) which is in line with prior predictions on the impact of risk and strategy-related activities and provides evidence for hypotheses H_{2_b} and H_{2_c}. We also find that the coefficient for Scope_Expand (hypothesis H_{2_a}) fails to load on the five percent level but is significant at the ten percent level (0.715*). To be more specific, these results are indicative of a positive relationship between the inclination of internal auditors to engage in joint audits and scenarios where (a) the devotion of internal audit resources to the area of risk management is emphasized or (b) if internal audit results are used in the process of strategic control.

Additionally, our findings indicate positive and highly significant results that strengthen our hypothesis H_{3_a} on the association between IAF decentralization in an international context and the performance of joint audits (IAF_Decentral 0.441***). Moreover, the positive coefficient for Int_Challenges loads on the one percent level providing strong evidence for the association

[16] Variance inflation factors are below 2 with a mean of 1.46.

[17] In additional analysis, we include an interaction term to capture the relationship between both underlying variables of our IAF resource measure and note that both regression models yield substantively equivalent results. Because accurate interpretation of interaction terms in logit regressions requires complex testing (Ai & Norton, 2003), we focus on the outcomes of the initial model.

Table 4.4
Regression model: Joint audits

DV = Joint_Audits	**Coefficients**	**Standard**	**z**	**Significance**
Variable		**errors**		**P > |z|**
Log_IAF_Size	-0.098	0.191	-0.51	0.608
Resource	0.805**	0.396	2.03	0.042
Charta	0.845	0.678	1.25	0.213
Outsource	-0.047	0.114	-0.41	0.682
Scope_Expand	0.715*	0.371	1.93	0.054
Risk_Mgmt	0.274**	0.127	2.17	0.030
Strategic_Control	0.356**	0.153	2.32	0.020
IAF_Decentral	0.441***	0.160	2.75	0.006
Int_Challenges	0.394***	0.149	2.65	0.008
Foreign_Sales50	0.762**	0.369	2.06	0.039
Finance	0.303	0.447	0.68	0.498
Listed	-0.214	0.399	-0.54	0.592
Country effects	Yes			
N	220			
Pseudo R^2	0.225			
Prob $> chi^2$	0.000			
Log-likelihood	-113.002			
$\chi^2_{(14)}$	46.33			

* p<0.1, ** p<0.05, *** p<0.01

Coefficient p-values are two-tailed and robust standard errors follow White (1980)

Variables are defined in Appendix 4.A.

between cultural or regulatory induced challenges and the IAF's supplemental sourcing of external or internal expertise (hypothesis H_{3_b}). For the control variables, only our indicator variable on moderate levels of international firm activities is positively associated with joint audits (Foreign_Sales50 0.762**) while both Finance and Listed fail to load on either the five or ten percent level (0.303, -0.214).

In a further step, we split our dependent variable Joint_Audits into three different regression models; each capturing the relationship between a particular group of audit partners (external auditors and/or other external local experts, locally appointed internal auditors, specialist peers from other functions) and our set of independent variables. The outcomes of the corresponding regression models are documented in Table 4.5. Interestingly, the results of the multivariate analyses yield clear patterns when regarding the direction and relevance of distinct determinants of joint

audit engagements for each group.

Table 4.5
Regression models: Joint audit partners

Variable	**DV = JA_Ea**		**DV = JA_Local_Ia**		**DV = JA_Peer**	
	Coeff.	**P $>$ |z|**	**Coeff.**	**P $>$ |z|**	**Coeff.**	**P $>$ |z|**
Log_IAF_Size	0.013	0.940	0.343	0.182	-0.231	0.333
Resource	0.367	0.341	-0.241	0.666	1.164***	0.003
Charta	0.495	0.462	-0.283	0.757	0.744	0.356
Outsource	-0.015	0.853	0.010	0.933	-0.109	0.523
Scope_Expand	0.975**	0.015	0.306	0.586	0.375	0.380
Risk_Mgmt	0.166	0.219	0.084	0.629	0.473***	0.001
Strategic_Control	0.337***	0.006	-0.023	0.887	0.009	0.948
IAF_Decentral	-0.112	0.394	0.396**	0.010	0.385***	0.003
Int_Challenges	0.326**	0.018	0.394**	0.020	0.146	0.297
Foreign_Sales50	0.917***	0.007	0.381	0.417	0.003	0.993
Finance	0.285	0.514	0.789	0.185	-0.624	0.216
Listed	-0.278	0.452	0.400	0.419	0.194	0.643
Country effects	Yes		Yes		Yes	
N	220		220		220	
Pseudo R^2	0.1883		0.2521		0.1976	
Prob $> chi^2$	0.000		0.000		0.000	
Log-likelihood	-119.123		-75.722		-98.378	
$\chi^2_{(14)}$	50.34		40.03		45.50	

* p<0.1, ** p<0.05, *** p<0.01

Coefficient p-values are two-tailed and robust standard errors follow White (1980)

Variables are defined in Appendix 4.A.

First, we find significant results for the Scope_Expand (0.975**) and Strategic_Control (0.337***) coefficients on the five and one percent level, respectively, being positively associated with our outcome variable which represents joint audits with external auditors and/or other external local experts. This provides evidence for the argument that external auditors are perceived as crucial pillars and sources of knowledge in instances where internal auditors are expected to provide services beyond the traditional internal audit scope (compliance, data security, quality management, legal affairs, risk management, and controlling). Also, external auditors seem to play a vital role as partners when internal audit work is implemented into the process of strategic control.

Also, two of our measures related to international challenges and organizational internationalization (Int_Challenges 0.326**, Foreign_Sales50 0.917***) are significantly associated with

joint audits including external auditors and/or other external local experts. This finding is in line with the notion that internal auditors can avoid duplication of efforts and travel costs when relying on the work of external auditors (O'Regan, 2013).

Second, replacing the first outcome variable with a dichotomous measure on joint audits with locally appointed internal auditors provides evidence for the distinctiveness of internationalization as both variables describing the environmental context of joint audits positively load on the five percent level (IAF_Decentral 0.396**, Int_Challenges 0.394**). This provides strong support for our hypotheses H_{3_a} and H_{3_b} and is consistent with our narrative that centralized IAFs which operate in a culturally and regulatory challenging environment resort to joint efforts with intermediaries, such as expatriates or local natives, to fulfill their role as organizational boundary spanners.

Finally, our third regression model yields three positive and highly significant variable coefficients that are associated with our final outcome variable on joint audits together with specialist peers from other functions. Our measure for small and highly effective IAFs (McDonald, 2003) is significant on the one percent level (Resource 1.164***) which supports our line of argumentation that internal expertise is likely to be consulted when IAF size is constrained and used to enhance the existing pool of professional resources. Moreover, the positive loading of Risk_Mgmt (0.473***) provides strong evidence for the importance of internal assurance providers (e.g., compliance or risk management) in their ability to sustain the IAF's role within enterprise risk management.

Furthermore, IAF decentralization (IAF_Decentral 0.385***) is positively associated with cooperative audit engagements involving specialist peers, which substantiates the earlier illustration by Fraser and Henry (2007) on the relevance of local experts (e.g., controllers) who facilitate risk assessment tasks of internal auditors delegated by company headquarters.

4.4.3 Sensitivity analysis

Several amendments were made to our basic regression model (as reported in Table 4.4) to probe the validity of our results. We add four measures on internal audit objectives to control for the IAF's focus on the effectiveness of the internal control system (IC_System 0.257); the effectiveness of the compliance management system (CM_System -0.220); the economic efficiency of business processes (Econ_Efficiency -0.126); and fraud prevention and detection (Fraud -0.072) and find that our results remain unaffected while none of the added variables load on either the ten, five, or one percent level.

We also perform a more thorough analysis of our resource narrative (H_{1_a}) by replacing the natural log of IAF size with the ratio of IAF size per 1,000 employees (total number of internal auditors, ratio of total internal auditors divided by total employees) and note that none of these measures yield evidence for a significant relationship (see Table 4.6). The model is further

extended by the introduction of a dichotomous independent variable (Capacity 0.279*) which captures the number of net audit days available per year for each auditor on a scale of one to six.[18] The reported results remain mostly unaffected by these adjustments as only Foreign_Sales50 no longer yields significant results at the five percent level (Foreign_Sales50 0.695*).

Table 4.6
Regression model: Sensitivity analysis

DV = Joint_Audits	**Coefficients**	**Standard**	**z**	**Significance**
Variable		**errors**		**P** $>$ |**z**|
IA_Per1000	0.007	0.023	0.30	0.765
Capacity	0.279*	0.148	1.88	0.060
Resource	1.036**	0.444	2.33	0.020
Charta	0.727	0.819	0.89	0.374
Outsource	-0.085	0.155	-0.55	0.585
Scope_Expand	0.721*	0.384	1.88	0.060
Risk_Mgmt	0.347**	0.161	2.16	0.031
IC_System	0.257	0.208	1.23	0.217
CM_System	-0.220	0.199	-1.10	0.270
Econ_Efficiency	-0.126	0.209	-0.60	0.547
Fraud	-0.072	0.187	-0.38	0.702
Strategic_Control	0.374**	0.166	2.25	0.025
IAF_Decentral	0.392**	0.155	2.53	0.011
Int_Challenges	0.444***	0.157	2.82	0.005
Foreign_Sales50	0.695*	0.384	1.81	0.071
Finance	0.238	0.453	0.53	0.599
Listed	-0.134	0.419	-0.32	0.750
Country effects	Yes			
N	213			
Pseudo R^2	0.254			
Prob $> chi^2$	0.000			
Log-likelihood	-105.228			
$\chi^2_{(19)}$	50.85			

* p<0.1, ** p<0.05, *** p<0.01

Coefficient p-values are two-tailed and robust standard errors follow White (1980)

When replacing our IAF decentralization-measure derived from principal component analysis (IAF_Decentral) with each of the three underlying variables (foreign hubs divided by total number of internal audit units; expatriates and foreign natives divided by total number of internal auditors) in our basic regression model, we find positive significant results on either the one or five percent

[18] Categories were reversed to measure the degree of resource-scarcity, so that 1 = more than 220 days; 2 = 201 to 220 days; 3 = 181 to 200 days; 4 = 161 to 180 days; 5 = 141 to 160 days; and 6 = less than 141 days per auditor.

level for each measure (Perc_Foreignloc 2.305***; Perc_IAforeign 3.637**; Perc_IAnatforeign 2.887***). This observation is consistent for both our primary and amended regression model and substantiates the validity of our reported results.

4.5 Conclusions and limitations

Our exploratory research on internal audit collaboration behavior investigates a rich array of factors that induce the frequently practiced joint audit phenomenon. The importance of this issue is derived from both the notion that internal audit resources are acknowledged as critical constituents of internal audit quality (Abbott et al., 2016; Ege, 2015; Ge & McVay, 2005) and the guiding force of professional institutions, such as the Institute of Internal Auditors (IIA), that advise professionals to augment existing resources via collaboration (IIA, 2007). Also, recent academic research identifies interfunctional cooperation as a profound driver of internal audit effectiveness (Coetzee & Erasmus, 2017).

To define the context of assurance and consulting engagements in which internal auditors frequently join forces with external auditors and other external local experts, locally appointed internal auditors, or specialist peers from other functions, we consider three different constructs that frame internal audit practice and incentivize collaborative efforts.

First, we concentrate on the implications of internal audit resources and structures. Both the resource-based view of the firm and the theory of dynamic capabilities propagate the central concept of firms' competitive core competencies that are combined and coordinated to persist in a highly competitive and rapidly changing environment. Collaboration can thus be understood as a means of overcoming internal audit resource constraints and to augment a small-dimensioned corpus of internal audit professionals. The results of a comprehensive survey directed at internal audit leaders provide evidence for a positive relationship between small and highly competent IAFs and jointly conducted audits.

Second, we focus on internal audit activities and processes that portray a transition of internal audit services resulting in the need for additional sources of knowledge. Internal audit activities are increasingly intertwined with the area of risk management to ensure the organization's achievement of strategic objectives which constitutes internal auditors' mission to add value. Both internal and external assurance providers are therefore predestined and explicitly mentioned as invaluable sources of knowledge for internal auditors in their mission to coordinate and assist in the implementation of the emerging enterprise risk management concept. In this scenario, our survey results indicate that both external auditors and peers from other functions are well-recognized confederates of the IAF.

Third, we advance on the conception of internal auditors as organizational boundary spanners that ensure management oversight and intra-organizational exchanges of knowledge in an interna-

tional environment. In this scenario, decentralized internal audit resources and local experts serve as key intermediaries in the internal audit's process of deciphering culturally encrypted bundles of information. Our empirical results provide evidence that especially locally appointed internal auditors play a pivotal role as competent joint audit partners in an international environment. However, both external auditors or comparable external experts and internal expert peers were identified as important allies to overcome cultural and regulatory challenges or to serve as ad hoc resource augmentations in a decentralized IAF environment.

Finally, our study is subject to a number of caveats. The fact that our sample reflects the views of participants from three different European countries, which vary slightly in terms of regulatory regimes and culture, makes it prone to country-specific influences. However, we address this issue of possible differences by including two variables which capture country-specific effects.

Also, using data from a questionnaire in our study means that our results are subject to limitations inherent to our methodological approach. That is, we rely on the correctness and accuracy of the survey respondents' replies. Thus, in cases where participating CAEs are questioned to provide personal opinions, it is likely that subjective biases potentially influence our data. Measures included in our model are for the most part based on unequivocal facts (e.g., the number of internal auditors, listing status of the organization) which means that the level of subjectivity is kept to a minimum. Moreover, because the proportion of CAEs who hold no membership with a national IIA chapter is minuscule, responses are mostly based on the views of participants with a professional background; implying that participants should be inclined to provide a "true and fair view". This, in turn, means that CAEs who are unaffiliated with any IIA chapter are strongly underrepresented within our sample which therefore limits the generalizability of our results.

Despite these limitations, our findings provide elementary insights on the to date barely explored phenomenon of joint audits in the internal audit profession. The results of our study open up several potential areas of future research, where the effects of this form of professional collaboration on internal audit quality might be of superior interest. Positive outcomes, such as fewer audit delays, synergy-related audit efficiencies, improved relationships with the audited entity and audit partners, or staff level induced cost savings are some of the examples that require further investigation in future studies.

Appendix

4.A Variable descriptions

Table 4.A.1
Variable descriptions

Variable Name	Description
	Dependent Variables
Joint_Audits	= 1 if the IAF performs Joint Audits with external auditors and/or other external local experts, regulators, locally appointed internal auditors, specialist peers from other functions, and equals 0 otherwise
JA_Ea	= 1 if the IAF performs Joint Audits with external auditors and/or other external local experts, and equals 0 otherwise
JA_Local_Ia	= 1 if the IAF performs Joint Audits with locally appointed internal auditors, and equals 0 otherwise
JA_Peer	= 1 if the IAF performs Joint Audits with specialist peers from other functions, and equals 0 otherwise
	Independent Variables
(1) - Internal audit structure and resources	
Log_IAF_Size	= natural log of the total number the organization's of internal auditors (in full-time equivalent)
CIA_Perc	= the number of internal auditors who possess a CIA certification divided by the total number of internal auditors within the organization
Resource	1 if relative IAF size (internal auditors per 1,000 employees) is below median and proportion of CIAs in the IAF exceeds the sample median, and equals 0 if otherwise
Charta	= 1 if the IAF's objectives and tasks are approved by the company management in writing (e.g. in an "audit charter" or in an "Internal Audit guideline"), 0 if otherwise
Outsource	= the average amount of IAF man-years (employee capacity) partially outsourced to external sources

(continued on next page)

Variable descriptions - continued

Variable Name	Description
(2) - Internal audit processes and activities	
Scope_Expand	= 1 if the IAF has other functions (compliance, data security, quality management, legal, and risk management or controlling) besides traditional audit activities, equals 0 otherwise
Risk_Mgmt	= a five item scale indicating whether the IAF currently pursues the objective of ensuring risk management effectiveness (1 = "does not apply" to 5 = "applies")
Strategic_Control	= a six item scale measuring to what extent IAF results are used for the management of strategic processes (0 = "never" to 5 = "very often")
(3) - Environmental factors	
IAF_Decentral	= component scores obtained from a principal component analysis of three different questions related to the structural internationalization of the IAF (relative number of decentralized IAF locations [Perc_Foreignloc]; relative number of IAF expatriates [Perc_IAforeign]; relative number of foreign natives in the IAF [Perc_IAnatforeign])
Int_Challenges	= cumulative five item score based on the degree of international challenges of the IAF (cultural understanding of the host country, cultural distance to the audited entity, language of the auditor, language of local employees/organizational entities, knowledge about local laws/regulations)
(4) - Organizational characteristics	
Foreign_Sales50	= 1 if the proportion of foreign sales ranges between 1 and 50 percent, and equals 0 otherwise
Finance	= 1 if the organization operates in the financial sector, and 0 if otherwise
Listed	= 1 if the organization is listed on a national stock exchange, and equals 0 if otherwise

4.B Cross-correlation table

Table 4.B.1
Cross-correlation table

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) Joint_Audit	1.000													
(2) Log_IAF_Size	0.139	1.000												
	(0.039)													
(3) Resource	0.183	-0.023	1.000											
	(0.006)	(0.738)												
(4) CIA_Perc	0.112	-0.177	0.600	1.000										
	(0.118)	(0.013)	(0.000)											
(5) Charta	0.061	0.068	0.082	0.083	1.000									
	(0.369)	(0.316)	(0.225)	(0.250)										
(6) Outsource	0.024	0.347	0.060	-0.015	0.040	1.000								
	(0.724)	(0.000)	(0.375)	(0.829)	(0.550)									
(7) Scope_Expand	0.006	-0.319	0.071	-0.013	0.004	-0.087	1.000							
	(0.931)	(0.000)	(0.297)	(0.857)	(0.955)	(0.198)								
(8) Risk_Mgmt	0.151	0.164	-0.088	-0.161	0.043	0.087	-0.180	1.000						
	(0.025)	(0.015)	(0.195)	(0.024)	(0.523)	(0.198)	(0.007)							
(9) Strategic_Control	0.141	0.055	-0.027	-0.007	-0.055	0.026	-0.090	0.116	1.000					
	(0.037)	(0.420)	(0.689)	(0.918)	(0.418)	(0.701)	(0.186)	(0.086)						
(10) IAF_Decentral	0.287	0.484	0.149	0.098	0.037	0.114	-0.123	-0.010	-0.008	1.000				
	(0.000)	(0.000)	(0.027)	(0.172)	(0.588)	(0.093)	(0.069)	(0.881)	(0.911)					
(11) Int_Challenges	0.336	0.217	0.241	0.155	-0.064	0.102	-0.076	0.002	-0.047	0.424	1.000			
	(0.000)	(0.001)	(0.000)	(0.030)	(0.346)	(0.132)	(0.260)	(0.972)	(0.492)	(0.000)				
(12) Foreign_Sales50	0.232	0.046	-0.036	0.060	-0.097	0.041	-0.078	0.138	0.086	-0.028	0.263	1.000		
	(0.001)	(0.498)	(0.594)	(0.401)	(0.151)	(0.543)	(0.247)	(0.041)	(0.201)	(0.674)	(0.000)			
(13) Finance	-0.012	0.162	-0.435	-0.099	0.078	-0.019	-0.347	0.199	0.088	-0.008	-0.192	0.139	1.000	
	(0.861)	(0.016)	(0.000)	(0.169)	(0.248)	(0.780)	(0.000)	(0.003)	(0.192)	(0.910)	(0.004)	(0.039)		
(14) Listed	0.143	0.330	0.064	0.062	0.052	0.060	-0.252	0.208	-0.074	0.325	0.306	0.179	0.160	1.000
	(0.033)	(0.000)	(0.349)	(0.391)	(0.442)	(0.377)	(0.000)	(0.002)	(0.276)	(0.000)	(0.000)	(0.008)	(0.018)	

Note: Variables are defined in Appendix 4.A.
(p-values listed below correlation coefficients).

Chapter 5

Compensation of internal auditors: Empirical evidence for different impact factors

5.1 Introduction

The internal audit function (IAF) has become one of the main pillars of good corporate governance over the last years (Gramling et al., 2004). With their consulting and assurance activities, internal auditors can improve business processes or internal controls and therewith, add value to the company (Carcello et al., 2018).

Furthermore, compensation studies from the Institute of Internal Auditors (IIA) record a salary increase over the last years (IIA, 2014, 2015b, 2017e). This increase can also be seen as an indicator of a heightened appreciation for the work of chief audit executives (CAE) and the IAF in the companies. Other market reports add to this notion in their observation of intensified demands for qualified internal audit resources (Barclay Simpson, 2017).

On the other hand, numerous compensation studies with a focus on executive directors or other board members find significant effects between compensation and the quality of corporate governance (Richardson & Waegelein, 2002; Vafeas & Waegelein, 2007). Both fixed and incentive-based compensation are widely seen as mechanisms to align employees' interests with those of the company in order to satisfy the shareholder or stakeholders needs and to reduce agency problems (Baker, Jensen, & Murphy, 1988; Brickley, Bhagat, & Lease, 1985; Mohd Hanafi & Stewart, 2015). Following this line of thoughts, a CAE with a high salary and incentive-based compensation structure should also lead to an improved IAF quality and, ultimately, corporate governance quality.

To maintain an adequate level of independence, both the compensation structure (Christopher, Sarens, & Leung, 2009) and budget (CIIA, 2019) of the CAE are to be determined either by the board of directors or one of its subcommittees (e.g., audit or compensation committee). Fixed components of the CAE's compensation are in this context contingent upon the CAE's organizational status, which frequently is on par with senior executives. However, addressing the inconsistent adoption of the compensation-formation process, prior literature opposes practices that vest company management with CAE compensation authority instead of the board (e.g., McHugh & Raghunandan, 1994).

In a principal agent setting, the CAEs (as agents) are motivated through their compensation structure to step up efforts on the improvement of business processes and assurance, which satisfies the management and shareholders (as principals) in the long run. However, there is also empirical evidence that incentive-based compensation incites employees to bias performance measures and to maximize their own income (Watts & Zimmerman, 1990). Providing a somewhat ambivalent case for such objectivity constraints, Schneider (2003) finds that incentive-based compensation tied to company stock prices can cause internal auditors to be more lenient in their reporting behavior when faced with GAAP violations. The author's finding is not confirmed for direct ownership or earnings related remuneration.

Only few studies present empirical evidence on the effects of internal auditors' compensation on governance from an academic perspective. Most of these publications focus on the decision making of internal auditors or the reliance of the external auditor (EA) from a behavioral or experimental point of view (Dezoort, Houston, & Peters, 2001). Also, several theoretical studies with a focus on the overall audit fees do exist. Interestingly, the results show a negative effect between the total amount of IAF compensation and the reliance of the EA, as one of the other pillars of good corporate governance, on internal auditors' work outcomes. Similar to the problematic performance measures mentioned above, the evidence indicates a loss of objectivity and, consequently, a lower reliance of the EA on IAF's results.

Acknowledging the overall scarcity of academic output on this matter, we motivate our study based on the fact that information about the determinants of CAE compensation schemes is highly limited to this date. Given that most of the few existing studies concentrate on the outward effects of the salary level of staff auditors, we aim to shed light on the often times unobservable and, therefore, substantially opaque drivers of the CAE remuneration. More importantly, our perspective is not confined to externally reported firm characteristics, as we also consider characteristics inherent to the IAF such as the relationship towards its key stakeholders and the actual quality structure of the function. By investigating the circumstances that shape the role and responsibilities for which the CAE is compensated, rather than merely studying the characteristics of the individual CAE, we aim to contribute to a deeper understanding of what drives CAE compensation.

While much of the recent research has reached consensus on the construct of IAF quality and its influence on external parties (Felix, Gramling, & Maletta, 2001; Messier & Schneider, 1988; Schneider, 1984), it is yet unknown how some of the quality defining criteria, such as internal audit competence and independence, are being factored in when it comes to the internal valuation of the function. Although the level of certification, for instance, serves as a popular means to ascertain IAF competence (Krishnamoorthy, 2002) and is commonly recognized as a consistent substantiation for higher salary levels according to most of the IIA compensation studies (IIA, 2017e), no empirical confirmation can be found to corroborate this relation.

Unlike prior studies that rely on experimental settings (e.g., Dezoort, Houston, & Peters, 2001), we utilize a logistic regression with proprietary data from questionnaire responses of 212 CAEs to analyze the effects of the aforementioned IAF related characteristics. Interestingly, we find significant positive effects for different quality indicators such as percentage of certifications, staff rotation programs as well as audit committee subordination on different salary levels of the CAE. Furthermore, we find significant positive effects for firm dependent factors such as foreign sales, nationality and listing status of the respective firm. Our results contribute to the existing literature in numerous ways. First of all, we present empirical evidence for positive effects of characteristics that are commonly associated with competence and independence of the IAF and are often recognized by external parties such as the EA. Furthermore, we find positive significant

effects for firm dependent factors such as percentage of foreign sales, investments in IAF proxied by IAF size, and listing status of the respective firm.

This study is further motivated by the practical importance which the internal auditor's compensation carries. As compensation can influence the appeal that pursuing a career in internal auditing has among possible recruits (Bartlett et al., 2016), extending the available knowledge of what drives compensation is ultimately of value to the profession. Additionally, we expect this chapter to help increase the awareness of the internal auditing profession as a career path. This study should thus be of interest to practitioners and researchers alike.

Our results contribute to the existing literature in numerous ways. First of all, we provide empirical evidence for positive effects of characteristics that are commonly associated with the competence and independence of the IAF and are often recognized by external parties such as the EA. Furthermore, we identify firm related factors that exert direct influence on CAE compensation levels and can therefore be seen as fundamental drivers of the IAF valuation alongside quality related aspects. This study is also the first to provide insights on CAE compensation in the German-speaking area. Overall, our results lay the groundwork for numerous directions of future research and might serve as a first benchmark for practitioners in the field of internal auditing.

The remainder of this chapter is structured as follows. After a discussion of the prior literature and the development of our hypotheses in the respective section (5.2), section 5.3 explains our research design and data set. Section 5.4 then presents our empirical results and derives implications for our posed hypotheses. Section 5.5 offers robustness checks, before section 5.6 concludes with a discussion of our findings and addresses limitations of the study.

5.2 Literature review and hypothesis development

While there is an extensive body of literature on executive compensation examining the determinants of chief executive officer (CEO) compensation (e.g., Core, Holthausen, & Larcker, 1999; Farid, Conte, & Lazarus, 2011; Tosi, 2000, for extensive studies of the literature), to the best of our knowledge, no empirical evidence for the compensation of CAEs exists. Thus, we derive a theoretical framework from the CEO literature to investigate the CAE compensation. The standard principal-agent paradigm is often invoked in finance and accounting research to understand the CEO labor market. In this paradigm, the board of directors is assumed to negotiate at arm's length with the CEO, and the optimal contract ties CEO compensation to shareholder wealth (Rajgopal, Taylor, & Venkatachalam, 2012). Differentiated compensation schemes are used by organizations to align the interests of all employees with owners (see Baker, Jensen, & Murphy, 1988). In the CAE labor market, the salary of the CAE is predetermined by the audit committee, CEO or senior management who influence the compensation structures and members of the audit committee or board of directors who approve it. At least once a year, the audit committee should review

the performance of the CAE and approve the annual compensation and salary adjustment (e.g., Fountain, 2016; Soh & Martinov-Bennie, 2011). The audit committee or board of directs act on behalf of shareholders to reduce the information asymmetry between mangers and shareholders based on the work of the CAE and, more generally, the IAF. Thus, considering that the CEO and CAE compensation scheme have the same final purpose, reducing potential agency conflicts and creating an alignment of the interests of the CAE/CEO and the principal, their determinants can be derived by the same theories.

First, compensation is determined by productivity that is related with effort, skills acquired from education and other skills. Economic models of compensation generally assume that higher performance requires greater effort and, in order to provide incentives for this effort, these models predict the existence of reward systems to structure the compensation schemes (Baker, Jensen, & Murphy, 1988). Economic models support the human capital interpretation of the educational structure of wages. Education is valuable to workers, in terms of higher wages, as it yields skills that increase their productivity (Boissiere, Knight, & Sabot, 1985). Evidence shows that general managerial skills are associated with an increase in CEO wages (Murphy & Zabojnik, 2004). To attract higher-ability CEOs, companies must pay them relatively more (Black, Dikolli, & Dyreng, 2014).

In the CAE setting, a higher ability can be inferred based on competences acquired by auditors at the staff level as it is a necessity that the CAE at least matches, if not surpasses, the level of competence of his subordinates to avoid getting marginalized. Such competences can often be ascribed to educational training (e.g., professional certification) or the acquisition of highly ambitious talent (e.g., as part of rotational career programs). Internal auditors are expected to "[...] possess the knowledge, skills, and other competencies needed to perform their individual responsibilities" (IIA, 2017a, § 1210). The *American Institute for Certified Public Accountants* (AICPA, 1990) states external auditors should consider several specific factors in evaluating IA competences, including professional certifications (also Prawitt, Smith, & Wood, 2009). Competence, measured using the percentage of certified IAF members, is valued as an important factor in the external auditor's evaluation of the IAF (e.g., Brown, 1983; Messier & Schneider, 1988). The presence of staff with, for example, Certified Internal Auditor (CIA) certifications is a proxy of higher competence in the IAF. This certification by the global Institute of Internal Auditors (IIA) implies that internal auditors have passed an examination based on the IIA program covering different audit-related topics, and have specific experience in their profession (IIA, 2017a, 2017e).

The literature argues that managers responsible for overseeing and assessing work outcomes by other employees cannot rely solely on leadership skills but are deemed to possess topic-specific knowledge to assign tasks and evaluate performance (e.g., Bernard, 1984). Thus, we assume that to lead qualified staff, the CAE needs to be himself/herself adequately qualified. Thus, we expect

that the presence of CIAs in the IAF is positively associated with CAE compensation.

Moreover, the IAF is often characterized by a high turnover, especially when it is used as a management training ground (MTG) (e.g., Barrier, 2001). Prior research and practitioner reports show that more than fifty percent of companies use the IAF as a MTG to rotate their internal auditors into management positions (see IIA, 2015a). How this affects the quality of internal audit services and consequently the compensation scheme, however, is subject to controversy. As prior research indicates, using the IAF as a MTG can be double-edged sword as it is associated with impaired auditor objectivity while simultaneously holding advantages in terms of increased levels of competence of the function. Consistent with the former argument, Messier et al. (2011) not only document that using the IAF as a MTG is associated with increased financial statement audit fees, but provide an explanation in that external auditors hold negative perceptions about the objectivity of MTG internal auditors, causing them to refrain from relying on internal auditors' work and assistance. This is ascribed to the internal auditors' inclination to acquiesce to the demands of executive managers in order to advance to career-promoting management positions; consequently resulting in lower financial reporting quality (Christ et al., 2015; Rose, Rose, & Norman, 2013), management misconduct (Ege, 2015), and biased risk assessments as well as investment recommendations (e.g., Hoos et al., 2018).[1]

Contrary to the external auditors' perspective, Carcello et al. (2018) find that firm managers tend to rely more on internal auditors' work outcomes in the presence of rotational career development programs as participating auditors are associated with comparatively higher levels of ability and knowledge of the company. The notion of enhanced competence is further strengthened by CAE interview statements included in (Christ et al., 2015, p. 44):

> "[...] as far as expertise, having rotational [auditors] enlightens people and provides more wisdom to them from the competencies that they're bringing in, so it enhances the department totally."

Also, the existence of a MTG is found to enhance auditor-auditee relationships (Sarens & D'Onza, 2017) due to the auditor's company related experience and ability to provide insightful recommendations. Additionally, Burton et al. (2015), in an experiment with 269 senior and graduate accounting students, conclude that job advertisements which characterize internal auditing as a rotational career program and consulting activity are more likely to attract highly qualified and experienced as well as motivated student job candidates.

Although researchers remain undecided about the eventual effects of rotational IAF programs, the vast popularity of the management training ground concept emphasizes the notion of widespread

[1] It should be noted, however, that effective internal audit oversight, as provided by a capable management and audit committee, is likely to compensate for the MTG induced lack of IAF objectivity (e.g., Christ et al., 2015).

acceptance among practitioners. Therefore, management seemingly perceives that the positives of such career development programs in terms of increased IAF competence outweigh possible negatives (i.e., impaired IAF objectivity). We therefore conclude that the existence of a management training ground (MTG) is associated with higher levels of IAF competence, as perceived by management, and therefore leads to higher levels of CAE compensation.

$\mathbf{H}_1$: IAF competences are positively associated with CAE compensation.

Secondly, management literature shows that the relationship to different stakeholders is an important component of the usefulness of work and the generated output. For example, the work and the output (of CEOs) are directly related to their compensation. To further investigate the relationship to different stakeholders, the output of the specific work is often used as a proxy. In the CEO setting, standard models analyze CEOs' work output based on firms' performance (e.g., accounting and stock return measures of performance) and their compensation (e.g., Baber, Janakiraman, & Kang, 1996; Lambert & Larcker, 1987; Sloan, 1993). Since we cannot measure the concrete output of the CAE with one specific variable, we argue that the collaboration with the CEO, the audit committee and other main stakeholders is a possible proxy for the work output of the CAE. Thus, we expect that CAEs' work output, measured through the accumulated usage intensity of different stakeholders, is positively related with CAEs' compensation.[2]

Prior studies identify the objectivity of individuals within the IAF as fundamental for providing value-added services (e.g., D'Onza et al., 2015). The safeguarding of organizational independence and individual objectivity is imperative to allow internal auditors to perform their assurance and consulting services effectively (De Zwaan, Stewart, & Subramaniam, 2011). In this context, CAE subordination to the audit committee is a proxy for organizational independence (Abbott et al., 2016; Abdel-Khalik, Snowball, & Wragge, 1983; Maletta, 1993). Given the absence of requirements concerning the IAF's organizational structures, CAEs can be subordinated to different functions within the firm. A decision to be subordinated to the CEO or the executive boards can impair auditor independence for audits of the work of superiors. In other words, the existence of strong stakeholder relationships which promote IAF independence increase the usefulness of the IAF's output (see De Zwaan, Stewart, & Subramaniam, 2011; D'Onza et al., 2015) and, given that work output is related to compensation, we therefore expect CAE independence to be associated with higher CAE compensation.

[2] Results of the CAE's work can be used by the executive board with varying intensities. The audit customers' expectation gap could result in the perception that the IAF is simply an obstacle to achieving organizational objectives. This can lead to underutilized audit services and ignored audit recommendations (e.g., Flesher & Zanzig, 2000). The usage intensity is a proxy for the IAF's relationship to stakeholders. A board that values the CAE's work will use the results of this work more intensively and will be available to pay a higher compensation for high quality work.

$\mathbf{H}_{2_a}$: The more intensive the stakeholder relationships are, the higher is the CAE compensation.

$\mathbf{H}_{2_b}$: A direct subordination of the CAE to the Audit committee leads to a higher CAE compensation.

Thirdly, firm characteristics are expected to determine CAE compensation. Especially since firm characteristics are a well-known proxy for the investment into the IAF and the need to monitor the company. IAF size, for example, is an overall measure of the entity's investment in internal controls, where smaller firms are expected to have weaker internal controls (DeFond & Jiambalvo, 1991; Prawitt, Smith, & Wood, 2009). Carcello, Hermanson, and Raghunandan (2005a) find a positive association between company size and IAF budget. They argue that IAF size is a proxy for agency cost because larger firms necessitate greater monitoring and thus more significant investment into their IAF. Therefore, as well as because the number of subordinates a manager oversees is thought to have a positive effect on compensation levels (Alkadry & Tower, 2006; Simon, 1957), we expect a positive association between IAF size and CAE compensation levels.

Literature argues that the IAF in publicly listed companies has a higher quality compared to the IAF in private companies. Clatworthy and Peel (2007) argue that, for example, scandals in listed companies are likely to result in larger potential reputational losses for the (external/internal) auditor and the management. Ittonen, Johnstone, and Myllymäki (2015) find that in Finland, auditors with greater specialization in auditing public firms provide comparatively higher audit quality due to the fact that they develop a keen sense for the reputational risks their public clients are facing. Often, listed companies are imposed with stricter regulatory requirements related to internal controls, their managers and financial reporting, and they face reputational scrutiny in the event of an internal control or financial reporting failure (e.g., Anderson et al., 2012; Arena & Azzone, 2009; Srinivasan, 2005).[3] We therefore expect that the heightened risk of severe reputational losses and litigation which public companies face increases the demand for high quality CAEs who are expected to assume expanded accountability. Consistent with the argument that CEOs receive incremental compensations for bearing a multitude of firm related risks (e.g., Cordeiro & Veliyath, 2003), we in turn posit that CAEs who face serious ramifications for failures in a public firm's

[3] Paragraph 91 (2) in the German Stock Corporation Act states: "The management board shall take suitable measures, in particular surveillance measures, to ensure that developments threatening the continuation of the company are detected early" (Norton Rose Fulbright, 2016). This essentially translates into the fact that management must establish a proper risk management system including internal controls. Paragraph 289 of the German Commercial Code also requires the management of listed companies to report upon the basic characteristics of their internal control and risk management system. Regulations in Austria and Switzerland are qualitatively similar.

governance structure earn comparatively higher salaries than their peers.

The complexity of firm operations, and consequently, the intricacy of its transactions increase as the firm operates, for example, in international markets or diversified product portfolios. Prior research documents that complexity is a significant determinant of the level of CEO pay (see Black, Dikolli, & Dyreng, 2014; Rose & Shepard, 1997). Firms with greater complexity and scope of operations are more likely to encounter internal control problems. The more complicated the firm's transactions, the more difficult to structure adequate internal controls (Ashbaugh-Skaife, Collins, & Kinney, 2007). Doyle, Ge, and McVay (2007a) argue that there are additional staffing challenges introduced by having international operations. This complexity requires higher investments into the IAF and thus higher expected CAE compensation.

The level of risk a company is exposed to and the ensuing demand for internal monitoring may be influenced by industy characteristics (Beasley, Carcello, & Hermanson, 1999; Maletta & Wright, 1996). Carcello, Hermanson, and Raghunandan (2005a) and Barua, Rama, and Sharma (2010) find positive associations of both IAF size and membership in the financial and services industries. Compared to many other industries, financial institutions face higher compliance risks and increased scrutiny from regulators (Carcello, Hermanson, & Raghunandan, 2005a). IA is mandatory in banks, insurances and pension funds and such financial companies have stringent requirements for their internal control systems, such as the periodical evaluation of the effectiveness of risk management which is reported to the industry supervisory authority (Deutsche Bundesbank Eurosystem, 2014; Federal Financial Supervisory Authority, 2012). We therefore expect that the knowledge needed to address higher risks and additional requirements in financial firms necessitates greater investment in CAE compensation.

$\mathbf{H}_3$: A higher degree of complexity (measured through size, industry type, listing and foreign sales) is associated with CAE compensation.

5.3 Research design and data set

5.3.1 Survey and sample

For our sample we surveyed chief audit executives (CAEs) from Austria, Germany and Switzerland together with the three national IIA chapters from these countries. The survey is used by the national IIAs for benchmarking purposes and to identify important trends in the profession. The institutes provided our proprietary database on conditions of anonymity and confidentiality. There are no specific indicators to identify the respondents and to include further (financial) information. The questionnaire is revised on a three-year basis to include current trends and modify questions etc. It has overall more than 80 questions from different areas of internal auditing (e.g., structure, reporting, quality management). Together with the national institutes, an extensive pre-test of the instrument was conducted with CAEs from different organizations.[4] Using feedback from these CAEs as well as from the national IIAs, the questions were aligned with the research topic of this study.

An online-survey was used to facilitate access to the questionnaire. The survey was available for one month (January 2017). Overall, the national IIAs sent the survey invitation to 1,916 participants; all of them are CAEs, from different organizations. Of those, 212 participants provided usable responses for the questions that are relevant for this study (response rate of 11.1 percent). The participants represent a broad variation of firm sizes and industry types, with roughly 34 percent of the sample coming from the financial sector. About 47 percent of the sample companies are listed and employ around 17,000 employees on average (additional descriptive statistics can be found in Table 5.1). All data received was reviewed and cleaned to ensure responses were entered appropriately and interpreted correctly.[5]

5.3.2 Model

In order to explore the research hypotheses, an ordinal logistic regression model is adopted, since the dependent variable is measured on a seven-point scale. The equation reads as follows:

$$\begin{aligned} \text{CAECOMP} = \{&\beta_1 \text{CIA} + \beta_2 \text{MTG} + \beta_3 \text{USAGEINT} + \beta_4 \text{AC OVRSGHT} + \beta_5 \text{IAF SIZE} \\ &+ \beta_6 \text{LIST} + \beta_7 \text{FORSALE} + \beta_8 \text{FINANCE} + \beta_J \text{CONTROLS}\} + \varepsilon. \end{aligned} \tag{5.1}$$

[4] The organizations participating in our pre-testing represent a broad variety of industries (e.g., banking, manufacturing, insurance, etc.) and mainly larger organizations. The participating IAFs can be evaluated as best practice examples for the whole profession and active members of their national IIAs.

[5] The Swiss CAEs were asked to answer questions in euro and not in Swiss francs. Hence, all values reported in the survey results are in euro.

This model uses robust standard errors following White (1980). Variable definitions are described in Appendix 5.B. Each variable is based on a specific question of the survey. CONTROLS represents a vector of control variables.

The dependent variable of interest is CAECOMP, which represents the level of CAE compensation from 1 (less than 50,000 euro) to 7 (more than 150,000 euro).[6] CAECOMP includes both fixed and variable salary components for the year 2016, following the approach of Dezoort, Houston, and Peters (2001) which also covered the total salary. The total cash compensation has also been used to study the pay of firms' executive management (e.g., Boyd, 1994; Rajagopalan & Prescott, 1990). This categorical variable is used to motivate the CAEs to answer a question about their personal compensation since a free text field was perceived as too sensitive. While a number of studies shed light on the effects of internal auditors' incentive-based compensation (Mohd Hanafi & Stewart, 2015; Schneider, 2003), to the authors' knowledge, this study is the first to investigate the factors that drive the overall compensation level of CAEs.

Furthermore, the model includes eight independent variables to analyze possible factors that influence the compensation level and to test the hypotheses. In order to capture the IAF characteristics concerning competence (hypothesis H_1), first, the variable Certified Internal Auditor (CIA) is included. It represents the percentage of an IAF's members who carry the title of Certified Internal Auditor and is operationalized following Abdolmohammadi (2009) and Anderson et al. (2012). In order to obtain and keep the CIA certification, candidates are required, among other things, to pass an exam and to pursue professional education continuously. Therefore, having certified personnel is an indicator for the IAF's comparatively higher overall competence, which in turn also requires the CAE to be more highly qualified so that he/she is equipped to manage and evaluate staff accordingly. β_1 is thus expected to be positive. Moreover, the variable management training ground (MTG) is included to capture the importance of the IAF's goal to prepare employees for future leadership positions. Prior literature often uses an indicator variable to denote whether the IAF serves as a MTG (e.g., Abbott et al., 2016; Anderson et al., 2012; Messier et al., 2011), while this study measures the importance of the IAF as a MTG on a five-point Likert scale to capture more nuanced differences concerning the use of the IAF as a MTG. β_2 is expected to be positive because regularly rotating new employees into the IAF means IAF members expand their company-specific knowledge and skills and are remunerated accordingly. Additionally, since highly motivated individuals are expected to self-select into an IAF which serves as a MTG, compensation payments are expected to be higher.

To examine the IAF's relationship with its main stakeholders (executive board and audit committee) and to test hypotheses H_{2_a} and H_{2_b}, the model includes the variables USAGEINT and AC OVRSGHT. Usage intensity (USAGEINT) is measured on a five-point scale from very low

[6] See Appendix 5.B for further details.

to very high and measures the intensity with which the management board uses the IAF's work. This measurement can also be found in other studies (e.g., Carcello et al., 2018). AC OVRSGHT is a dummy variable assuming a value of one if the CAE is disciplinarily subordinated to the company's audit committee and which was used in prior studies (e.g., Abdel-Khalik, Snowball, & Wragge, 1983; Maletta, 1993). A positive sign for both β_3 and β_4, is expected, first, because a board that values the CAE's work as important should be willing to pay a comparatively higher compensation to obtain useful results. Secondly, because the audit committee subordination indicates a high level of independence, this results in increased objectivity and autonomy of the CAE and more useful IAF work output.

In order to test for company characteristics (H_3), the four variables IAF SIZE, LIST, FORSALE and FINANCE are included. The variable IAF SIZE represents the natural logarithm of the number of people employed in the IAF given as the full-time equivalent and including administrative workers as well as supervisors. This variable is operationalized following Carcello, Hermanson, and Raghunandan (2005a) who use the number of internal audit staff. The variable IAF SIZE thus acts as a proxy for investments in the IAF due to the larger (smaller) size of the company and the associated increased (decreased) need for monitoring. β_5 is expected to be positive since higher investments in the IAF due to increased internal control demands should elicit higher investments in the compensation of the responsible CAE. LIST is a dummy variable with the value of one if the company is listed, as used by Arena and Azzone (2009). β_6 is expected to be positive, given that higher negative outcomes from a reputation loss in listed firms necessitate greater monitoring. According to Bartlett and Ghoshal (1987), operating in an international environment increases a firm's organizational complexity. Thus, FORSALE is used as an indicator for the company's complexity measured by the percentage of revenues the company generates abroad. A higher (lower) percentage of foreign sales indicates a comparatively higher (lower) complexity of the company's structures and operations. The expectation for β_7 is positive since complexity requires a higher investment in the IAF, and thus higher expected CAE compensation. This variable is operationalized following Abbott, Parker, and Peters (2010) who employ foreign sales as a percentage of total sales. FINANCE is a dummy variable with the value of one if the company belongs to the finance industry (including banks, financial institutions and insurances), used as an indicator variable similarly to Abbott, Parker, and Peters (2012b). β_8 is expected to be positive as higher knowledge to address additional requirements in financial firms necessitates greater investment in CAE compensation. Both industry as well as the aforementioned listing status are relevant for the importance and (regulatory) need to install an effective IAF.

Lastly, the model includes CONTROLS, a vector of control variables, to control for systematic differences in the CAE compensation across countries as well as the amount of additional expertise the IAF hires. In a similar manner to Carcello, Hermanson, and Raghunandan (2005a), we control for the outsourcing of IAF activities. OUTSOURCE represents the additional staff capac-

ity the IAF recruits from both inside and outside the company annually measured as full-time staff equivalent. According to Serafini et al. (2003), outsourcing can be used by CAEs when specific skills or expertise which are needed for a project are unavailable within the organization. In line with the assumption about competence present within the IAF having a positive influence on CEA compensation levels, having to contract external capacities should be negatively associated with CAE compensation. Furthermore, country effects are included: GER is a dummy variable with the value of one, if the responding CAE is employed in Germany; CH is a dummy variable where the value of one indicates the responding CAE being employed in Switzerland. The comparison group is made up of CAEs being employed in Austria.

5.4 Results

5.4.1 Descriptive statistics and tests for multicollinearity

Table 5.1 provides descriptive statistics. For the dependent variable, CAE compensation, the average on a seven-point scale is 5.5, which translates to an annual salary of between 110,000 and 130,000 euro in the year 2016. Independent variables are distributed as follows: Concerning IAF competences, on average, 25.2 percent of an IAF's members are Certified Internal Auditors (CIA) while there are IAFs on both ends of the spectrum with either none of their members being CIAs or all of them holding the CIA-title. On a five-point scale the average importance of the use of the IAF as management training ground (MTG) lies at 2.3, indicating that regularly rotating new auditors into the function in order to prepare them to take on leadership roles ranks comparatively low among the average IAF's goals. Looking at stakeholder relationships, with a mean of 4.1 and a 25th percentile of 4.0 on a five-point scale, USAGEINT illustrates that, on average, the IAF's work is used intensively by the company's management board. As for the relationship to the audit committee, only 15.1 percent of respondents are disciplinarily subordinated to the audit committee. IAF SIZE, as the natural logarithm of full-time equivalent IAF staff, averages 2.0. A little less than half of our sample is made up of CAEs working for listed companies (46.7 %). The average amount of sales realized in non-domestic markets is 29.4 percent of a company's total sales and thus denotes the average level of company complexity. Table 5.1 shows that our sample consists of companies on either end of the spectrum, including companies of comparatively low complexity which operate exclusively in their respective domestic market (no foreign sales) as well as a companies which generate their revenue almost exclusively in non-domestic markets with the maximum of 99 percent of sales being foreign sales. Roughly a third of the surveyed CAEs work for companies that are based in the finance industry (34.0 %) and are therefore subject to increased supervision and stricter regulations. The average additional expertise which an IAF hires is 0.75, which translates to three quarters of a full-time staff member annually. With 67.0 percent, the majority of respondents in the sample are CAEs working in Germany, while 20.3 per-

cent are working for IAFs in Switzerland. The remaining 12.7 percent of respondents work for an Austrian company.

Table 5.1
Summary statistics

Variable	Mean	Std. Dev.	Min.	p25	Median	p75	Max.
CAECOMP	5.448	1.720	1.000	4.000	5.000	7.000	7.000
CIA	0.252	0.296	0.000	0.000	0.140	0.425	1.000
MTG	2.296	1.328	1.000	1.000	2.000	3.000	5.000
USAGEINT	4.066	0.895	1.000	4.000	4.000	5.000	5.000
AC OVRSGHT	0.151	0.359	0.000	0.000	0.000	0.000	1.000
IAF SIZE	2.023	1.164	0.000	1.099	1.946	2.773	5.598
LIST	0.467	0.500	0.000	0.000	0.000	1.000	1.000
FORSALE	0.294	0.338	0.000	0.000	0.130	0.600	0.990
FINANCE	0.340	0.475	0.000	0.000	0.000	1.000	1.000
OUTSOURCE	0.750	2.522	0.000	0.000	0.000	1.000	30.00
GE	0.670	0.471	0.000	0.000	1.000	1.000	1.000
CH	0.203	0.403	0.000	0.000	0.000	0.000	1.000
AT	0.127	0.334	0.000	0.000	0.000	0.000	1.000

Note: Refer to Appendix 5.B for variable definitions.

Appendix 5.A Table 5.A.1 presents the cross-correlations. It shows that there are no high levels of correlation between the independent variables of the model as all values are well below the threshold suggested by literature (Kennedy, 2008). Moreover, the variance inflation factor (VIF) is employed to check for collinearity between the explanatory variables. All variables have a VIF below the recommended maximum value of five (Rogerson, 2001). Thus, it is noted that collinearity of variables does not seem to be an issue for this study.

5.4.2 Regression results

Table 5.2 presents the results of the ordered logistic regression used to test our hypotheses, focusing on different CAE compensation determinants. The overall model is significant (p-value $<$ 0.001), with a pseudo R^2 of 0.368. Supporting the first hypothesis about IAF competence, the results indicate that a higher percentage of CIAs within the IAF positively affects the salary level of the CAE (CIA 1.571, p-value 0.004). Further corroborating the first hypothesis (H_1) favorably, the results provide evidence that using the IAF as a MTG (MTG 0.343, p-value 0.014) is associated with higher levels in the CAE compensation schemes. This indicates that hiring new staff not only

offers new perspectives to vitalize the knowledge pool of the function but that employees join the IAF specifically to expand their company-specific knowledge and acquire specialized skills. This combination results in a more qualified IAF, positively affecting the compensation of the CAE, who is charged with managing the function.

Table 5.2
Estimation results: Determinants of CAE compensation

Variable	**Estimate**	**p-value**
Dependent Variable: CAE Compensation		
CIA	1.571***	0.004
MTG	0.343**	0.014
USAGEINT	0.015	0.924
AC OVRSGHT	2.523***	0.005
IAF SIZE	1.414***	<0.001
LIST	0.752**	0.025
FORSALE	2.911**	<0.001
FINANCE	0.734	0.078
OUTSOURCE	-0.276***	0.002
Country effects	included	
N	212	
Mean Variance Inflation Factors	1.54	
Pseudo R^2	0.368	
Coefficient p-values are two-tailed and robust standard errors follow White (1980)		
Significance levels of the ordered logit regression ** : 5 % *** : 1 %		

Note: Refer to Appendix 5.B for variable definitions.

Consistent with H_{2b} concerning the relationship to audit committees, the results show that certain organizational reporting structures of the CAE are significantly associated with higher levels of CAE compensation (AC OVRSGHT 2.523, p-value 0.005). More specifically, a subordination of the CAE to the audit committee reflects the ability as well as the need to operate independently (e.g., Abbott et al., 2016; Abdel-Khalik, Snowball, & Wragge, 1983; Maletta, 1993) and leads to a more valuable IAF output that is remunerated accordingly. This leads to the assumption that the CAE's capability of maintaining well-functioning relationships with the audit committee in terms of reporting exerts direct influence on his compensation.

Consistent with hypothesis 3 (H_3) about the firms' characteristics, responsibility for a larger IAF is associated with a higher salary (IAF SIZE 1.414, p-value <0.001) which reinforces the

theory that larger companies tend to have more resources and risk related incentives to invest into internal auditing (Carcello, Hermanson, & Raghunandan, 2005a; DeFond & Jiambalvo, 1991; Prawitt, Smith, & Wood, 2009). Furthermore, CAEs of listed companies are more likely to receive higher salaries than CAEs of non-listed companies (LIST 0.752, p-value 0.025) which can partly be attributed to the increased need for assurance and exculpation by a company's management which is often highly liable and strongly driven by reputational concerns (Anderson et al., 2012; Arena & Azzone, 2009). FORSALE (2.911, p-value <0.001) indicates a positive relation between internationally operating companies and CAE compensation, adding to the literature on complexity and internal controls (Ashbaugh-Skaife, Collins, & Kinney, 2007; Doyle, Ge, & McVay, 2007a). Finally, turning to the control variables, OUTSOURCE (-0.2763, p-value 0.002) has a significant negative effect on CAE compensation.

5.5 Robustness

The model is run on observations coming from three different countries. While country effects are controlled for, particular country characteristics can influence the CAE compensation level. Possible wage differences between Germany, Switzerland and Austria, the three countries our survey participants are located in, should be considered.

Table 5.3
Robustness analysis

Variable	**Model 1**		**Model 2**		**Model 3**	
	Estimate	**p-value**	**Estimate**	**p-value**	**Estimate**	**p-value**
CIA	1.569***	0.004	1.346**	0.013	1.343**	0.014
MTG	0.341**	0.013	0.275**	0.045	0.285**	0.039
USAGEINT	0.015	0.925	-0.112	0.438	-0.102	0.477
AC OVRSGHT	2.541***	0.004	1.953**	0.014	1.879**	0.021
IAF SIZE	1.412***	<0.001	1.467***	<0.001	1.469***	<0.001
LIST	0.756**	0.024	0.382	0.220	0.394	0.208
FORSALE	2.910***	<0.001	2.586***	<0.001	2.657***	<0.001
FINANCE	0.734	0.078	0.688	0.071	0.680	0.075
OUTSOURCE	-0.275***	0.001	-0.103	0.416	-0.111	0.358
Hourly earnings	0.700***	0.001				
%Employees less2/3			-0.156***	<0.001		
Employment protection					-1.064***	<0.001
Country effects	excluded		excluded		excluded	
N	212		212		212	
Pseudo R^2	0.368		0.281		0.288	

Coefficient p-values are two-tailed and robust standard errors follow White (1980)

Significance levels of the ordered logit regressions ** : 5 % *** : 1 %

Note: Refer to Appendix 5.B for variable definitions.

Data on wages and labor costs for the three countries was downloaded from Eurostat and included as substitutions for the country dummy variables. Table 5.3 Model 1 shows the results controlling for the median gross hourly earnings of all employees (excluding apprentices) by country.

Table 5.3 Model 2 shows results controlling for the percentage of employees (excluding apprentices) earning less than two thirds of the median gross hourly earnings by country. Finally, Table 5.3 Model 3 shows the results controlling for the employment protection by country, representing an indicator built using an average of different indicators for regular contracts (procedural inconveniences, notice and severance pay for no-fault individual dismissals, difficulty of dismissal) and short-term contracts (fixed-term and temporary) by country following Pagano and Volpin (2005). Results are qualitatively the same as in the main analysis using country dummy variables. All coefficients are positive and significant as expected, with the exception of US-AGEINT, LIST, and OUTSOURCE.

5.6 Discussion and conclusion

The primary objective of this study was to identify possible factors that influence the compensation level of CAEs. While there is some empirical evidence that the type of compensation (e.g., fixed vs. variable compensation) affects the objectivity, no empirical results identify possible drivers of the compensation. Furthermore, most prior studies that investigate internal auditors' compensation applied an experimental approach, especially on the staff level, so that the proprietary data set which was used allows this study to generate unique insights. To the authors' knowledge, this approach is the first to empirically investigate CAE compensation drivers and to establish a connection between the CAE's compensation and factors such as the company's complexity by using a broader database.

This chapter provides evidence on the association between IAF characteristics, stakeholder relationships, and firm characteristics on CAE compensation. It finds significant positive effects for IAF competence on CAE compensation. Employing the IAF as a management training ground for future leadership positions has a significant positive effect on the responsible CAE's salary as does the employment of CIAs. Furthermore, looking at the relationship of the IAF to different stakeholders, this study finds significant positive effects for the CAE's subordination to the audit committee. In contrast, no significant effect for the intensity with which the board of directors uses the IAF's work could be documented. Both the IAF's size, its listing status, as well as the company's complexity as proxied by the percentage of foreign sales, have a significant positive effect on CAE compensation. The amount of outsourcing has a significant negative effect on the CAE's compensation.

Results can be interpreted in light of agency theory, looking at potential conflicts between

CAEs with their IAFs, on the one hand, and the audit committee or board of directors, on the other hand, showing that CAE compensation is related to IA independence, competences and firms' investment in it. This chapter supports the theory that compensation is an instrument to reduce information asymmetry and increase IAF quality. Furthermore, this study finds supporting evidence for the economic theory on compensations being linked to education in the internal audit labor market. IAF competence, as demonstrated through professional certification and continuing education, was identified as one of the main drivers of CAE compensation. Further, these findings indicate that companies that assess internal audit work to be a valuable and value enhancing task for personnel development and thus place a stronger emphasis on training specialists and future leaders by rotating them into the IAF, are also investing more in the IAF leadership itself. CAE compensation levels are accordingly higher.

This study also finds evidence for the relationship between higher payment and a higher reputational loss. Large, public and/or international companies with, for example, stringent regulatory requirements and a higher level of complexity require higher investment in the IAF, and thus expected higher CAE compensation to avoid the negative outcome of a reputational loss.

Our study contributes to the existing literature in numerous ways. First, by providing empirical evidence regarding determinants of internal auditor compensation, it contributes to the growing field of internal auditing literature and answers the call for more research on the IAF (Fanning & Piercey, 2014; Lenz, Sarens, & D'Silva, 2014). By investigating IAF characteristics and stakeholder relationships alongside company characteristics, this chapter offers insights on the IAF as part of the company's governance system by contributing to a deeper understanding of the role and responsibilities of the CAE and how these are valued monetarily within the respective company. Taking into account that relatively few regulations and guidelines exist regarding the establishment and ongoing organization of an IAF within a company, it is important to further investigate internal auditors' working environment and conditions, one of which is the compensation they receive for their labor. This study's results are, therefore, relevant to practitioners as they provide benchmarks for CAE compensation, especially considering the IAF and different company characteristics.

Furthermore, findings fill an important gap in the literature and help to strengthen the scientific discussion. While a number of studies shed light on the effects of internal auditors' incentive-based compensation (e.g., Mohd Hanafi & Stewart, 2015; Schneider, 2003), to the authors' knowledge, this study is the first to investigate the factors that drive the overall compensation level of CAEs. Analyzing the effect specific compensation structures have on the IAF's relationship to parties outside of the company, such as external auditors, is highly relevant. However, examining the characteristics and dynamics inside the company which drive the IAF's compensation level is of at least equal importance. Investigating the underlying factors which determine the make-up of the CAE's salary provides insights on the individual CAE's standing as well as on the intricate position the IAF holds within a company.

Recent company scandals serve to emphasize that leaders of an IAF are responsible for the identification and audit of main risk areas. The study's findings indicate that factors such as IAF size and company complexity drive CAE compensation and that companies are aware of the resulting responsibilities and willing to remunerate their CAEs accordingly. Similarly, it is interesting to see that the IAF-staff's competence seems to go hand in hand with a higher CAE compensation, a circumstance indicating that firms that understand the importance of investing in their staff, for example by providing them with resources such as time and money to get certified and to keep up their status as a CIA through regular attendance of seminars and classes, are also willing to invest in a competent CAE's salary.

This study is subject to the following limitations. First, due to the structure of the survey, categorial variables had to be used to measure compensation, where continuous variables might have provided more nuanced information. Furthermore, the results are based exclusively on questionnaire data, and, as is common for studies using survey data, results are subject to a possible response bias as they rely in part on the participants' assessment of a given situation.

This study opens up a variety of future research avenues: Using different research methods such as conducting an interview study to verify and deepen our understanding of what drives CAE compensation poses a useful extension to survey-based results. Future studies could also expand the research subject to include data sets on compensation from other European or Non-European countries in order to investigate country and culture specific salary differences. Using archival data to investigate the effect of internal auditors' compensation on their performance could provide additional useful insights while also addressing the issue of incentive-based compensation. This could complement past experimental studies in which results suggest that internal auditors' objectivity is impaired when compensation is tied to company performance (e.g., Mohd Hanafi & Stewart, 2015). Lastly, research on drivers of compensation of internal auditors from varying hierarchy levels would pose a valuable addition to the presented findings.

Appendix

5.A Cross-correlation table

Table 5.A.1
Cross-correlation table

Variables	1	2	3	4	5	6	7	8	9	10
CAECOMP (1)	1.000									
CIA (2)	0.089	1.000								
	(0.196)									
MTG (3)	0.357	0.048	1.000							
	(0.000)	(0.487)								
USAGEINT (4)	0.058	-0.068	0.135	1.000						
	(0.404)	(0.325)	(0.049)							
AC OVRSGHT (5)	0.3518	0.194	0.215	0.102	1.000					
	(0.000)	(0.005)	(0.002)	(0.140)						
IAF SIZE (6)	0.561	-0.196	0.345	0.136	0.168	1.000				
	(0.000)	(0.004)	(0.000)	(0.048)	(0.015)					
LIST (7)	0.329	0.049	0.236	0.047	0.134	0.250	1.000			
	(0.000)	(0.482)	(0.001)	(0.494)	(0.052)	(0.000)				
FORSALE (8)	0.395	0.155	0.412	0.177	0.357	0.184	0.362	1.000		
	(0.000)	(0.024)	(0.000)	(0.010)	(0.000)	(0.007)	(0.000)			
FINANCE (9)	0.144	-0.080	-0.158	0.003	-0.080	0.172	0.127	-0.341	1.000	
	(0.037)	(0.245)	(0.021)	(0.968)	(0.247)	(0.012)	(0.064)	(0.000)		
OUTSOURCE (10)	0.120	0.106	0.090	-0.047	-0.136	0.201	0.071	0.044	0.075	1.000
	(0.082)	(0.123)	(0.192)	(0.494)	(0.048)	(0.003)	(0.307)	(0.528)	(0.276)	

This table reports Pearson correlation coefficient and p-value in parentheses. Refer to Appendix 5.B for variable definitions.

5.B Variable descriptions

Table 5.B.1
Variable descriptions

Variable Name	Question	Descripton
CAECOMP	What was the CAE's gross salary (fixed and variable) for the year 2015?	Scales from 1 to 7, where 1 = less than 50,000 euro, 2 = 50,000 to <70,000 euro, 3 = 70,000 to <90,000 euro, 4 = 90,000 to <110,000 euro, 5 = 110,000 to <130,000 euro, 6 = 130,000 to <150,000 euro, 7 = 150,000 euro or more
Independent variables		
IAF competences		
CIA	What percentage of IAF members hold the title Certified Internal Auditor (CIA)?	Percentage of CIAs on the IAF
MTG	Please indicate whether preparing high potentials for specialist or leadership positions (through the use of the IAF as a management training ground) is a goal of the IAF?	Scale from 1 to 5 where: 1 stands for "does not apply" and 5 for "fully applies"
Stakeholder relationships		
USAGEINT	In your opinion, how intensively are the results of the IAF's work used from 1 to 5 by the management board?	Scales from 1 to 5, where: 1 if low use and 5 is intense use
AC OVRSGHT	Is the CAE disciplinarily subordinated to the audit committee?	1 for "yes" and 0 for "no"
Complexity		
IAF SIZE	What is the total number (FTE) of IAF employees?	Natural logarithm of total full time equivalent (FTE) of IAF employees
LIST	What is the company's listing status?	1 for "Listed" and 0 for "Not listed"
FORSALE	How much revenue does the company generate abroad?	Percentage of foreign revenues over total revenues
FINANCE	Which industry does the company belong to?	1 for "Credit and financial institutions including Banks", "Insurance companies", "Pension and social institutions" and 0 for "Non-Financial Industry"
Control variables		
OUTSOURCE	How much additional IAF staff capacity (FTE) do you purchase annually?	FTE of additional IAF staff capacity
GER	Where is the firm you work for located?	1 for "Germany" and 0 otherwise
CH	Where is the firm you work for located?	1 for "Switzerland" and 0 otherwise
AT	Where is the firm you work for located?	1 for "Austria" and 0 otherwise
Variables from other sources		
Hourly earnings	Labor market, Wages and labor costs: median gross hourly earnings, all employees (excluding apprentices) by country (source: Eurostat)	
%Employees less2/3	Labour market, Wages and labor costs: percentage of employees (excluding apprentices) earning less than two thirds of the median gross hourly earnings by country (source: Eurostat)	

(continued on next page)

Variable descriptions - continued

Variable Name	Question	Description
Employment protection		Average of indicators for regular contracts (procedural inconveniences, notice and severance pay for no-fault individual dismissals, difficulty of dismissal) and short-term contracts (fixed-term and temporary) by following Pagano and Volpin (2005) values increase with the strictness of protection

Chapter 6

Conclusion

This thesis took a twofold methodological approach to analyze issues on internal audit and audit committee research and practice. Two bibliometric analyses were conducted to provide insights on the research meta in both research fields based on bibliographic data of published articles. Subsequently, questionnaire data was used to explore the determinants of internal audit joint audits and chief audit executive compensation. The chapters consequently offer different perspectives on the status of audit committee and internal audit research as well as on relevant topics in internal audit practice. The four chapters can be summarized as follows.

First, an analysis of citation and co-citation patterns was conducted to analyze the intellectual structure of audit committee research articles that were published between 1977 and the end of 2018 in six leading accounting journals (AOS, CAR, JAE, JAR, RAST, TAR). Results of the analysis highlight five co-citation clusters that outline the core research areas that emerged before and after the passage of the Sarbanes-Oxley Act. A content analysis of studies included in cluster number 1, as the dominant cluster, reveals a strong prevalence of empirical approaches that rely on archival data. It further documents an inconsistent focus within studies on a broad array of determinants of audit committee effectiveness. Other clusters document the homogenous adoption of agency theory as the theoretical underpinning of studies. The Sarbanes-Oxley Act stands out as a major catalyst of research in leading accounting journals.

Second, a citation, co-citation, and authorship analysis was conducted based on 170 articles (published in AOS, CAR, JAE, JAR, or TAR) that covered internal auditing either directly or peripherally and were published between 1926 and the end of 2016. Results of the analysis provide evidence for a weakly developed but growing field of research. Several groups of authors frequently collaborate on internal audit-related studies, but the overall state of authorships remains fractionalized. Early-stage research is primarily concerned with the interrelationship of internal and external auditing, whereas more recent co-citation patterns indicate a heightened relevance of the internal audit quality concept and its impact on financial reporting quality. Internal audit studies in the leading accounting journals are generally nested within research on internal controls over financial reporting, corporate governance, audit committee effectiveness, and external auditor independence. The chapter also provides several research questions that propagate the adoption of a more differentiated perspective on micro-level internal audit practices within leading accounting journals.

Third, multivariate regression analysis was used to explore a rich set of internal audit questionnaire data on the introduction of a joint audit approach within internal audit practice. The related chapter focuses on three theoretical constructs that determine the likelihood that internal auditors perform joint audits together with external auditors, other external local experts, locally appointed internal auditors or specialist peers from within the organization. The three constructs include internal audit structures and resources (internal audit size and relative level of proficiency), activities and processes (strategy and risk relatedness of internal audit practices, expansions of the

traditional scope) as well as environmental factors (internal audit decentralization and international challenges). Findings of the logistic regression analysis suggest that at least one measure of any concept positively influences the likelihood of a joint audit. However, a more detailed analysis of each joint audit partner reveals that environmental factors, such as international challenges the function encounters, or its increasing decentralization, are more consistently associated with the joint audit phenomenon.

Fourth, questionnaire data on the compensation scheme of chief audit executives was analyzed to shed light on the determinants of the specific compensation levels. Next to micro-level dimensions that cover internal audit competences and stakeholder relationships, the study further considers four complexity characteristics that cover both the audit function and the company. Results of an ordered logistic regression based on (chief audit executive) survey data show that internal audit competences, as reflected by the percentage of members with a Certified Internal Auditors certification and the presence of a management training ground concept, are positively associated with higher levels of chief audit executive compensation. Also, evidence is presented that a subordination to the audit committee positively affects chief audit executive compensation. This supports the notion of a positive relationship between a company's tone at the top and the appreciation of internal audit services. Finally, both the size of the function and the percentage of foreign sales are positively associated with the considered compensation scheme, thus providing partial evidence for the importance of internal audit and company complexity.

Future research is encouraged to study the development of audit committee and internal audit research as part of a broader bibliometric analysis of corporate governance research in both the leading and more specialized accounting journals. Moreover, it is certainly fruitful to consider less adjacent research fields such as management or information science, where internal auditing clearly has relevance. Another important prospect is the consideration of internal audit joint audits and the compensation of chief audit executives within archival datasets that are based on financial reporting information. Currently, this approach is inhibited by the fact that no data on internal audit characteristics is included in financial reports of companies. Additional research can provide evidence on the relevance of such disclosures and is encouraged to proceed in evaluating potential effects on investor confidence and financial reporting quality in general.

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