

Auditors in Technologies, Relations and Networks: Cases from the Assurance Service

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This
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To my mom, dad and bro'...

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Abstract

This article based doctoral dissertation investigates interactions, relations, and networks in auditing. To explore different aspects of relations, this work centers the discussion of the unfolding of interpersonal interactions, emergence of social relations and networks in the assurance service context, as the principal service offered by audit firms. The overall aim of the project is to investigate how implementation of information technologies influences interpersonal interactions among auditors, and how different actors' attributes play role on the emergence of relations, which further create various configurations within the overall social networks. The study is grounded on the literature and theories on disruptive technologies and clients' selection of auditor. To meet the proposed aim of the research, this dissertation adopts both qualitative and quantitative methodologies. In the overall, this dissertation stresses that, in order to understand social relations and networks, it is necessary to integrate and simultaneously examine the interdependencies between actors' attributes and existing relations within the observed social networks.

The aim of the thesis is addressed across three research articles, each answering a particular research question.

Paper 1 explores how and why implementation of the information technologies in audit firms impacts the unfolding of interaction and communication between auditors across different ranks. This article discusses how incentives for increasing productivity and ensuring reasonable quality of audit reports impact interpersonal interactions. Study outlines implications from findings reached from qualitative methodology and discuss them across different audit theories. A main finding indicates that auditors' trust in the IT is a main reason for diminished necessity for interactions and communication between auditors, particularly between different ranks.

Paper 2 extends the methodological capacities for conducting the research in accounting and auditing. It provides an overview on how current developments in social network analysis (SNA) could serve as a powerful methodological tool for conducting the research. This work outlines that social relation in a dedicated context of auditing need to be explored through the integration of social actors' attributes in order to enable understanding of focal relations. In short, the network methodology enables to mine beneath the properties of social relations e.g. the service exchange, and provides an understanding on how and what social actor attributes might influence the emergence of relations. This discussion results in a proposition for wider implementation of the relational and network methodologies within the studies of accounting and auditing.

Paper 3 investigates the interdependence between two social selection processes - auditor selection and interlocking directorships. Particularly, it discusses how reputation, as a market demand mechanism, creates interplay between two mutually interdependent selection mechanisms. The study employs exponential random graph models (ERGMs) to explore how such mechanisms evolve within the social network, and observes them across multiple models. Findings from the study suggest that reputation has significant but non-coincident impact to both observed processes. Interestingly, this work stresses that the concept of reputation seems to have prevalent role over the other market demand mechanisms.

With this dissertation, I contribute to the empirical domain of auditing service, both internally and externally, as I analyze both subjective and objective conditions that stipulate the unfold and emergence of interactions, relations, and networks - which represent the constituents of my future research interests.

This research will be of interests to scholars of accounting and auditing in general, and those interested in the methodology of social network analysis in particular.

Dansk resumé

Denne artikelbaserede Ph.D.-afhandling undersøger interaktioner, relationer og netværk indenfor revision. Med henblik på at studere forskellige aspekter af forbindelserne fokuseres på de interpersonelle interaktioner og udviklingen af sociale relationer og netværk i en revisionservice kontekst. Det overordnede formål med projektet er at undersøge, hvordan implementering af informationsteknologi påvirker det interpersonelle samspil mellem revisorer, og den rolle forskellige aktørers egenskaber spiller i udviklingen af relationer, hvilket medvirker til at skabe forskellige konfigurationer inden for de overordnede sociale netværk. Undersøgelsen er baseret på litteratur og teorier om informations teknologier og kunders valg af revisor. For at opfylde formålet med afhandlingen, anvendes både kvalitative og kvantitative metoder. Sammenfattende, fremgår det af denne afhandling, at for at forstå sociale relationer og netværk, er det nødvendigt samtidigt at undersøge den indbyrdes afhængighed mellem aktørernes egenskaber og de eksisterende relationer inden de observerede sociale netværk.

Formålet med afhandlingen er behandlet i tre forskningsartikler, der hver besvarer en bestemt problemstilling.

Artikel 1 undersøger hvordan og hvorfor implementering af informationsteknologi i revisionsfirmaer indvirker på interaktionen og kommunikationen mellem revisorer på tværs af forskellige niveauer. I artiklen beskrives hvordan incitamenter til at øge produktiviteten og sikre en rimelig kvalitet af revisionsrapporter påvirker de interpersonelle interaktioner. I artiklen diskuteres konsekvenserne af resultaterne opnået gennem kvalitativ metode og de diskuteres i forhold til forskellige revisionsteorier. En hovedkonklusion er, at revisors tillid til IT er en hovedårsag til mindsket behov for interaktion og kommunikation mellem revisorer, især mellem revisorer på forskellige niveauer.

Artikel 2 søger at udvide forskningsmetoder indenfor regnskab og revision gennem en diskussion af hvordan social netværksanalyse (SNA) kan tjene som et forskningsværktøj. Dette arbejde argumenterer, at sociale relationer i forbindelse med revision bør udforskes gennem inddragelse af de sociale aktørers egenskaber for at muliggøre forståelsen af fokale relationer. Netværkstilgangen gør det muligt mere detaljeret at undersøge egenskaberne ved sociale relationer, f.eks. tjenesteudvekslingen, og giver en forståelse af hvordan sociale aktørers egenskaber kan påvirke udviklingen af relationer. Denne diskussion resulterer i forslag til en videre anvendelse af relationelle- og netværksmetoder inden for studier af regnskab og revision.

Artikel 3 undersøger den indbyrdes afhængighed mellem to sociale udvælgelsesprocesser - revisorvalg og valg af bestyrelser. Det diskuteres særligt hvordan omdømme skaber samspil mellem disse to indbyrdes afhængige valgmekanismer. Undersøgelsen anvender exponential random graph-modeller (ERGMs) for at undersøge, hvordan disse mekanismer udvikler sig inden for det sociale netværk, og observerer dem på tværs af modeller. Resultaterne af undersøgelsen tyder på, at omdømme har betydelig, men ikke-sammenfaldende, indvirkning på begge observerede processer. Dette arbejde understreger, at begrebet omdømme synes at have en vigtig rolle i forhold til andre markedsefterspørgselsmekanismer.

Denne afhandling bidrager til revision som empirisk felt, både internt og eksternt, da jeg analyserer subjektive og objektive betingelser for udviklingen af interaktioner, relationer og netværk - som repræsenterer kernen af mine fremtidige forskningsinteresser.

Denne forskning vil være af interesse for studerende og forskere indenfor regnskab og revision i almindelighed, og de der er interesserede i metoder indenfor social netværk analyse i særdeleshed.

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PART I: SYNOPSIS

Introduction

An audit, as a social phenomenon, has evolved as a response to individuals' and groups' needs to obtain objective and independent assurance regarding the performance of others in which they have legitimate interest (Power, 1997). The service of auditing is defined as *a means of social control*, which according to Lee and Ali (2008) serves as a mechanism to monitor the conduct and performance of business entities, and facilitate accountability in their financial statements.

According to Lee and Ali (2008), the historical evolution of the professional service of auditing has witnessed changes in audit procedures due to the development and increasing complexity of clients' businesses, as well as the accounting systems and standardization of accounting procedures. From the rudimentary principles of the ancient civilizations of China, Greece, and Egypt, across the industrial revolution, to the advent of the Companies Act, the professional service of auditing has grown into the professional service which companies are now obligated to use (Lee & Ali, 2008). An increase in the complexity of companies' organizational structures, the large amount of transactional data, and urgency to provide assurance of clients' financial statements to various stakeholders have required audit firms to adapt procedures and increase work efficiency (Banker, Chang, & Kao, 2002; Bierstaker, Burnaby, & Thibodeau, 2001). The emergence of the digital economy and implementation of information technologies (IT) by business entities has dramatically influenced auditing procedures as well (Rezaee, Sharbatoghlie, Elam, & McMickle, 2002) and tremendously changed how the service is performed. Consequently, manual (traditional) audit procedures have become supported, and to a significant extent replaced by IT, where justification for altering procedures has been found in increased accuracy, productivity, timeliness, integrity of audit reports, and unburdening of human factor (Banker et al., 2002).

Those changes in procedures have intrigued researchers to explore the implications of the presence and use of technologies in auditing regarding various aspects of the audit profession, such as tasks, auditors as carriers of profession, organizations etc. (Omoteso, Patel, & Scott, 2010). With an explicit focus on the benefits of the utilization of IT, the previous studies have attempted to understand contributions, and critically examine positive aspects in order to encourage further utilization of technology in audit firms. Moreover, literature has demonstrated that IT has had various positive implications on efficiency and productivity of audit teams, as it added credibility to audit reports by facilitating auditors' thoughts

(Abdolmohammadi, 1991; Banker et al., 2002; Bierstaker et al., 2001; Omoteso et al., 2010). Nevertheless, Manson, McCartney, Sherer, and Wallace (1998) pointed out that parallel to development of the previous body of knowledge, another school of thought on audit approaches, named *organic*, has been devoted to discussions on the quality of professional judgments and the role a social actor (auditor) has in the audit procedures. Such a reflection in contrast to the previous body of knowledge has become the point of departure of this research project. The increased focus on the benefits of the use of technologies in auditing and the role IT has on the quality of audit reports has raised concerns about the importance of auditors (as human carriers of the profession) within a technologically equipped environment. In other words, it became relevant to explore how technology as a facilitator (Ellis, Gibbs, & Rein, 1991; Vandenbosch & Ginzberg, 1996-1997), through risk-based methodologies (Robson, Humphrey, Khalifa, & Jones, 2007) influences and disturbs the position of auditor within such an environment.

However, the importance of the previous critical discussion on communication and interactions between auditors triggered the initial idea towards the narrower area of social relations and networks in auditing context. The vast literature exploring the importance of collaborative and co-operative relations between auditors and other groups (Goodwin, 2003; Goodwin & Yeo, 2001; Morrison, 2002; Raghunandan, Rama, & Scarbrough, 1998; Sarens & De Beelde, 2006) have branched into multiple directions. Relations were mainly discussed as the exchange of benefits in terms of the contributions they provide to actors within that relation. Conversely, strategies for social relation emergence have not yet been observed from how to social actors' characteristics influence the formation of the relation. Such an insight has called for integration of the concepts of relations and networks, as they have recently become a crucial staple within the social studies (Borgatti and Foster, 2003), which have not been encompassed in the audit context.

This project has been inspired by the *actor relation effects* (individual attributes) (Lusher, Koskinen, & Robins, 2013, p. 26). Such a perspective aims to provide insight on how social actors' attributes impact the emergence of relations between two actors, which further serve to exchange benefits, e.g., service provision. By giving prominence to the actors' attributes (McPherson, Smith-Lovin, & Cook, 2001), I emphasize the importance of integrating social actors' subjective characteristics (Robins, 2015) in the discussion of the exchange of benefits. Thus, my argument is that we cannot solely observe the exchange of benefits as a "theoretical outlook" of the relations and networks, but we need to integrate social actors'

(subjective) attributes into the dialog with both theory and practice in order to augment our understanding of reality.

All the previous aspects became a point of departure for examining interaction, relations and the unfolding of social networks in the audit context. Thus, the aim of the thesis is:

To investigate how the use of technology in the audit process influences the unfolding of relations between auditors, and how and why social actors' attributes impact the emergence of relations and generate particular network configurations in the auditing context.

Research objectives and research questions

According to the previously outlined gap and the aim of this study, I narrow down the scope of the study by presenting four research objectives that are addressed in three separate research papers.

- *Research objective 1: To investigate the impact of information and communication technologies on relations between auditors within and across different audit ranks;*
- *Research objective 2: To introduce the methodology of the social network analysis and exponential random graph models to the studies of accounting and auditing;*
- *Research objective 3: To investigate the characteristics of the network between audit partners;*
- *Research objective 4: To investigate the structure and evolvement of social network consisting of auditors and clients in the process of auditor selection.*

First, I investigate auditors' perceptions regarding information and communication technology (ICT) as a determinant of interpersonal communication unfolding within teams composed of auditors belonging to different ranks. The aim of the study is to look at the trade-off between reliability in human versus technological carriers of the audit profession through which the discussion on significance of human actors is initiated. From the existing literature, we know that ICT, which positively contributes to productivity and efficiency, tends to be perceived as a reliable asset, but only to highly ranked auditors (superiors) (Manson, McCartney, & Sherer, 2001). Therefore, an investigation of auditors' perceptions about usefulness of technology is still important, not only from the perspective of low-ranked professional auditors, but from the

perspective of the cross-rank interaction, which can yield significant insights. The first objective contributes to the literature on implications of utilization of ICT in auditing on social relations and interactions.

Second, I emphasize the importance of extending the notion of relations in the context of auditing with the term *network*, which, in order to be adequately applied and understood, requires introducing the methodological approach of social network analysis and accompanying terminology (Robins, 2015). This objective aims at introducing the statistical method of exponential random graph models (ERGMs) to the research area of accounting and auditing. The second objective is a direct response to a modest body of knowledge on quantitative methods (Johansen & Pettersson, 2013), where studies discussing relations in auditing have primarily utilized regression. ERGMs are, from the network researchers' perspective, treated as "*an addition*" as they enable elimination of standard dependent/independent variables, which are more applicable to social network studies (Lusher et al., 2013). The study aims to enrich the range of available methodological tools that researchers in accounting and auditing could utilize to interpret network configurations from a wider range of theoretical perspectives.

Third, by utilizing social network analysis, the aim is to combine descriptive and simple statistics of social networks to discuss characteristics of the observed networks of audit partners. The aim is to inform researchers on the perspective that network methodology provides to researchers.

Finally, the last research objective aims at reflecting on the broad range of literature that previously discussed the reasons for auditor selection and change (see e.g. Beattie & Fearnley, 1995; Fontaine, Letaifa, & Herda, 2013; Magri & Baldacchino, 2004) and reputation. The aim of this study is to provide an empirical representation of how network methodology and ERGMs could be utilized in auditing research. The goal of this research is to investigate how social actors' attributes influence the emergence of social relations, and how those relations are mutually interdependent and influence the emergence of complex network configurations.

Table 1 presents an overview of research papers that constitute the main body of this Ph.D. dissertation presented in Part II. Additionally, the research questions answered in each paper are outlined. I also list the analytical approaches utilized in the final column of Table 1. The following section outlines the theoretical background for this work. Lastly, I outline the research gaps that the research questions intend to narrow.

Table 1 - Overview of papers that comprise this dissertation

Paper number and title (reference)	Research objective	Key words	Research question	Theoretical foundation	Analytical approach	Empirical foundation
<i>Paper 1: ICT in Auditing: Impact of Audit Quality Norms on Interpersonal Interactions</i> (Kacanski, 2016)	RO1: To investigate the impact of information and communication technologies on relations between auditors across different ranks.	Global audit methodology (GAM); information and communication technologies; audit quality; interactions	How and why does implementation of GAM into ICT impact the relationship between superiors and subordinates in a Danish auditing context?	Theory on ICT in auditing; computer assisted audit tools and techniques; modernity theory	Qualitative approach; open coding; axial coding	Exploratory study, interviews and archive data.
<i>Paper 2: The Application of the Social Network Analysis to the studies of Accounting and Auditing</i> (Kacanski & Lusher, forthcoming)	RO2: To introduce SNA and ERGMs into studies of accounting and auditing. RO3: To investigate the characteristics of the network between audit partners.	Social network analysis (SNA); exponential random graph models (ERGMs); network concepts	How can SNA be used in accounting and auditing research?	SNA concepts	Quantitative approach; SNA; ERGMS	Archive data - annual reports.
<i>Paper 3: The Reputation Driven Interplay of Relationships between Clients and Auditors in an Auditor Selection Process: A Multilevel Network Approach</i> (Kacanski, in press)	RO4: To investigate the evolvement of network between auditors and clients in the process of auditor selection.	Reputation, board of directors, interlocking directorships, network, ERGMs	How does reputation impact the social selection process in the auditing context?	Reputation theory; Network theory; Identity theory	Quantitative approach; multilevel networks; ERGMs	Archive data - annual reports.

Definition of concepts

What do technology, social actors, relations, and networks mean in this dissertation and how are they defined?

I understand technology as a social concept, rather than the self-contained construct, as an occasion that triggers social dynamics, which, in turn, modifies and maintains an organization's contour (Fountain, 2001). In order to bring the concept of technology closer to the theoretical and empirical context of investigation, I define IT in a slightly different manner. I borrow the definition from IFAC which corresponds to the previous standpoint. IFAC (2006, p. 5) defines IT as *"hardware and software products, information system operations and management processes, IT control frameworks, and the human resources and skills required to develop, use and control these product and processes to generate required information"*. However, I extend the previous definition by adding the term *communication* in order to adjust the previous definition with the aim of the research. To this end, I define the concept of ICT that is central to this dissertation as *"activities that involve communication and collaboration between social actors through which technology mediates"* (Omoteso et al., 2010). This extension of the IT concept is in compliance with the term *interaction*, which I define here as *"the reciprocal action or influence of two or more parties on each other"* (Oxford University Press, 2016).

On the other hand, to deepen the reflection on the concept of interaction between social actors, and extend the scope of inspection of interactions to relation between social actors, which represents reciprocation, I define relation as *"a collection of ties (linkages between a pair of actors) of a specific kind among members of the group"* (Wasserman & Faust, 1994, p. 18-20). In order to enable understanding a complex collection of ties, I introduce the concept of a network configuration that I define here as *"small local sub-graphs that occur within local neighborhoods of the network"* (Robins, Pattison, & Woolcock, 2004). I define the concept of social network as *a finite set of or sets of actors (discrete individuals, corporate, or collective social unit) and the relation or relations defined on them"* (Wasserman & Faust, 1994, p. 17-20). Table 2 refers to the list of main concepts in which each individual scientific paper is built upon.

Table 2 - Definition of main concepts

Paper 1	Papers 2 and 3
Concept, definition and reference	
Auditing - A systematic process of objectively obtaining and evaluating evidence regarding assertions about economic actions and events to ascertain the degree of correspondence between those assertions and established criteria and communicating the results to interested users (Silvoso, 1972).	
External audit - A periodic examination of the books of account and records of an entity carried out by an independent third party (the auditor), to ensure that they have been properly maintained, are accurate and comply with established concepts, principles, accounting standards, legal requirements and give a true and fair view of the financial state of the entity (CIMA, 2005).	
Technology - An occasion that triggers social dynamics, which, in turn, modifies or maintains an organization's contour (Fountain, 2001).	Actor - Discrete individual, corporate, or collective social unit (Wasserman & Faust, 1994, p. 17).
Information system - A set of people, procedures, and resources that collects, transforms, and disseminates information in an organization (O'Brien, 2003).	
Information technology - Hardware and software products, information system operations and management processes, IT control frameworks, and the human resources and skills required to develop, use and control these products and processes to generate the required information (IFAC, 2006, p. 5).	Relation - A collection of ties of a specific kind among members of the group (Wasserman & Faust, 1994, p. 20).
	Relational tie - Linkage between a pair of actors (Wasserman & Faust, 1994, p. 18).
Information and communication technology - ... <i>in addition to the previous definition it integrates...</i> activities that involve communication and collaboration between social actors through which technology mediates (Omoteso et al., 2010).	Network configuration - Small (local) sub-graphs that occur within local neighborhoods of the network. (Robins et al., 2004).
	Social network - A finite set of or sets of actors and the relation or relations defined on them (Wasserman & Faust, 1994, p. 20).
Audit automation - The use of computers in management, planning, performance and completion of audits to eliminate or reduce time spent on computational or clerical tasks, to improve the quality of audit judgments, and to ensure consistent audit quality (ICAEW, 1993, p. 5).	Homophily - The principle that contact between similar people occurs at a higher rate than among dissimilar ones (McPherson et al., 2001).
	Reputation - A perceptual representation of a social actor's past action and future prospects that describes its overall appeal (Fombrun, 1996, p. 72).

Empirical field of investigation

Grounded on the literature exploring the consequences of implementation of ICT on auditors and a literature on relations and social networks, this dissertation investigates issues of inter-subjective interactions and evolvement of social relations and networks in the context of auditing. It extends the research in two ways. First, it goes beyond interaction as a form of communication between social actors (Abdolmohammadi, 1991; Banker et al., 2002; Bierstaker et al., 2001; Omoteso et al., 2010) to understand the auditors' perceptions on the IT as a condition to evolvement of interpersonal interactions between auditors at different levels (ranks), and second, it refocuses the concept of relations from the exchange of benefits (ECIIA, 2013; Fontaine et al., 2013; Herda & Lavelle, 2013; Morrison, 2002; Raghunandan, Read, & Rama, 2001; Sarens & De Beelde, 2006) towards drivers that bring those relations to emergence, on a social actor's level.

Auditing represents a source of support in decision-making processes for various actors. It is a service offered by an external organization (audit firm) to inform parties on the reliability of presented financial information within a particular business entity's annual financial statements. Big 4 audit firms offer a wide range of non-audit services as well, such as consulting (management, risk), deals, legal, tax and other services. The work here focuses on the assurance service as the principal service. Audit professionals provide reports on reviewed annual statements, which are *cognition-based professional judgment* (Carpenter, Dirsmith, & Gupta, 1994) performed by audit teams (IFAC, 2009). Since the use of IT in the audit process has greatly increased in recent years, especially in Big 4 audit firms, the main motivation to accept technology to support/replace the previously cognitive nature of the audit procedures lies in the efficiency gained, through which they can compete for clients (Manson et al., 2001).

I selected Danish Big 4 audit firms as the main empirical context for paper 1, while for papers 2 and 3 I selected a sample of auditors affiliated with both Big 4 and non-Big 4 audit firms that were responsible for audit reports of those companies that were listed in the Copenhagen Stock Exchange.

In the following, I briefly summarize regulatory and professional characteristics that structure the environment within which the project has been conducted. To do so, I outline characteristics of audit team formation processes, risk-based methodologies used by audit firms, regulation on mandatory audit rotation, and corporate governance in Denmark. Those elements are considered important to this project, as information related to each of these elements have influenced the research design.

Firstly, a factor that impacts the quality of an audit is the structure of the audit team (Udeh, 2015). Formation of an effective audit team is not an automatic process, and should be guided by goals of particular audit engagement and procedures necessary to achieve those goals (Udeh, 2015). Audit teams are formed either based on client's needs (Dereli, Baykasoğlu, & Daş, 2007), or on auditors' and partners' preferences. Regardless of the strategy, teams of practitioners are assembled at different professional levels (Udeh, 2015). In principle, partners are responsible for the fit of audit team members to the audit engagement, but also for the quality of the procedures and reports. Responsibility for audit reports has been reassigned from audit firms to partners as in recent years more audit firms require from their audit partners to sign audit reports in their own name. This is related to the question of protection of audit firms' reputation (Skinner & Srinivasan, 2012), which is also the case in Danish practice. It implies that audit partners responsible for audit engagement are easily identifiable, and this information could be used to track responsibilities for audit failures, and may also be utilized for different research purposes.

Secondly, the audit profession is characterized by an extensive presence of ICT aiming at facilitating the productivity and efficiency of auditors' workload as well as contributing to better organization and structuring of tasks (Bierstaker et al., 2001; Manson, McCartney, & Sherer, 1997; Manson et al., 2001; Omoteso et al., 2010). Likewise, the Danish auditing practice is not immune to the global enforcements of *technologization*, since both representatives of Big 4 and non-Big 4 audit firms equally give space to implementation and utilization of a wide variety of technological tools (general and specialized) in order to alleviate functional capacities of auditors' manual work. Moreover, auditors utilize audit tools to fortify proficiency and accuracy while testing clients' data, including technology-based task-guiding methodology (Robson et al., 2007). This is a *risk-based* methodology that integrates the approach of conducting auditing assessments, which focuses on those parts of clients' businesses that have the highest audit risk (Manson et al., 1997). Additionally, audit automation contributes to the productivity and efficiency of conducting the audit tasks (Manson et al., 2001): it speeds up audit procedures and changes *traditional* audit engagement.

Thirdly, in Denmark, audit regulation has stipulated that publicly listed companies are required to make an appointment with two audit firms that will undertake an independent audit review of the financial statements of the company (Thinggaard & Kiertzner, 2008). This regulation was abandoned in 2005 (Johansen & Pettersson, 2013). The dismissal of previous regulation resulted in significant reductions in the number of audit firms in Denmark after 2005. Audit theory has different implications on audit quality and audit reports reflecting new

regulation on auditor and/or audit firm rotation (Ball, Tyler, & Wells, 2015; Myers, Myers, & Omer, 2003). The Danish regulation requires a '*pause*' period of, at least, two consecutive years after seven years of engagement with the same audit partner (Revisorkommissionen, 2006, p. 62). However, the EU audit reform on auditor rotation adopted in April 2014, and first applied to the financial year starting on or after 17th of June 2016, redefines the core requirement of 10-year audit rotation for all public interest entities (PIE) in the EU (PwC, 2015).

Fourthly, the document that regulates corporate governance in Danish companies regarding auditing is the 2006 amendment of the European Directive on statutory audit (article 41 in European Parliament, 2006). It provides regulation for PIE, which are defined *as those business entities that are governed by the law of a Member State (Denmark) whose transferable securities are admitted to trading on a regulated market of any member state* within the meaning of point 14 of Article 4(1) of Directive 2005/39/EC. The 2006 Amendment of the European Directive on statutory audit requires governing bodies of PIE to perform functions related to monitoring, accounting, and internal controls. In the Danish application of the Directive, this function could be performed either by a supervisory board (board of directors) or by an audit committee (Revisorkommissionen, 2006), if appointed.

Danish PIE include those companies that are listed on the Nasdaq Nordic stock exchange. The stock exchange is a subsidiary of NASDAQ Inc., which is recognized as the world's largest stock exchange that delivers trading, exchange technology and public company services across the globe. However, Nasdaq Nordic covers the exchange services of transferable securities from companies operating in Denmark, Sweden, Finland, Iceland, Latvia, Lithuania and Estonia. Regardless of the extensive list of countries covered under the operative of the Nasdaq Nordic, the sample of PIE that are included in the study are those that belong to the Danish subsidiary of Nasdaq, i.e. companies that are listed on OMX Copenhagen.

Usually, the board of directors (supervisory board) mainly comprises non-executive directors. Exceptions in structuring supervisory boards in Danish practice are allowed to the extent that non-financial organizations are permitted to intersect with their supervisory board memberships. This is allowed only up to 50% of the entire supervisory board size, while financial organizations, such as banks, are not authorized to have an executive director on the supervisory board.

In Denmark, recommendations of the auditor are made by non-executive directors, which are announced at the annual general meetings, but not necessarily including names of individual audit partners that will be appointed to a particular audit engagement. However,

prior studies revealed that executive directors might have an influence on the decision related to auditor appointment ultimately made by non-executives (Cohen, Krishnamoorthy, & Wright, 2009; Fiolleau, Hoang, Jamal, & Sunder, 2009), but later research revealed that this influence is decreasing in favor of the audit committee (Dhaliwal, Lamoreaux, Lennox, & Mauler, 2013).

Structure of the thesis

The overall Ph.D. dissertation is divided into two main parts:

1. **Part I - Synopsis.** This part introduces the area of research and provides an overall summary of the work that I carried out for the Ph.D. project:
 - Chapter one: I introduce the research objectives, research questions, main concepts that this dissertation deals with together with the description of the empirical field of investigation.
 - Chapter two: I discuss the theoretical framework applied in this dissertation.
 - Chapter three: I present the ontological assumptions, epistemological approach, and the research design together with considerations concerning generalizability, validity and reliability of results.
 - Chapter four: I present findings and the overall conclusion of the dissertation. To this end, I provide an outline of limitations and recommendations for future research.
2. **Part II** presents the main body of the dissertation consisting of three individual research papers.
 - Paper 1: *ICT in auditing: Impact of audit quality norms on interpersonal interactions* - The analysis of interview data revealed that productivity incentives, acceleration of audit procedures, and technologically determined procedural guidance disturb interpersonal communication between auditors across different ranks. Nevertheless, I do not profoundly challenge the concept of ICT, but rather use it to reflect on the process of comfort production through ritual chains (Pentland, 1993) in audit engagements across audit teams. The argument is that superiors and subordinates perceive trustworthiness differently, and this difference disturbs interactions between them.
 - Paper 2: *The application of social network analysis to studies on accounting and auditing* - This paper focuses on how to apply the social network analysis methodology to studies on accounting and auditing. I reflect upon theoretical and

empirical concepts, together with *a cutting edge* statistical method for network analysis, in order to support and emphasize the importance of integrating the network approach within the research field.

- Paper 3: *The reputation driven interplay of relationships between clients and auditors in an auditor selection process: A multilevel network approach* - The social network analysis of auditor selection processes is the foundation for discussion on the impact of reputation on relation emergence in the audit context. This paper reflects on two separate social selection processes (auditor and interlocking directorship selection) as mutually interdependent processes (Davison, Stening, & Wai, 1984), in order to examine a condition under which reputation drives the auditor selection process. Results revealed that reputation does not have a simultaneous impact on both social selection processes.

In continuation of Part 1, I present the definitions of the concepts that are used in this dissertation, depict the theoretical grounds of the research and delineate gaps that are tackled in Part II. The following section presents the empirical field of investigation, i.e. auditing service, with an overall focus on assurance service. In this section, I depict the nature and main characteristics of the field. In the methodology section, I outline the research strategy, research design and methods for data collection and analysis. Finally, I present and discuss the outcomes of the study by comparing them with existing literature, and provide an overall conclusion for this dissertation and the Ph.D. project.

Theoretical background

Introduction to the chapter

This section reviews the existing body of knowledge on which respective research papers in Part II are built upon. In this section, I review the existing literature from two separate perspectives: (1) implementation of ICT and (2) social relations and networks in auditing. I delineate a range of implications from the utilization of ICT (in its wider forms) in the auditing service that has been brought to practitioners, in order to elaborate the current perspectives which I used to delineate my research objectives and questions of *relations*, and further, *social networks*, within the same contextual scope. The theoretical background encompasses several branches to lay the groundwork of the emerging studies. Thus, I am applying an integrative or *eclectic* approach (Norcross & Prochaska, 1988), while deeper understandings of specific theoretical fields are elaborated in theoretical background sections in each research article in Part II.

The use of technologies in auditing

There is general agreement that *modern* auditing service, as a discrete professional practice, which is different from accounting, began to take on its current form in the middle of the 19th century - when corporate entities initiated the disentanglement of ownership from managerial function (Power, 1997, p. 16-17). Auditing has a property unlike almost any other professional service, that is the essential obscurity, which implies keeping the practical procedures away from public eyes. Power (1997) assumed that an institution's trustworthiness is conditioned by the property of obscurity, but he also argued that sustaining that trustworthiness is mined in institutions' capacity to reassure social criticism during significant times of social doubts. Seemingly, social trustworthiness, in fact, is the main driver of sustainability of the institution. Although society is separated from any audit procedures, it is yet in a position to determine institutional fate as it has a fundamental role in reassessing the trustworthiness, which becomes society's reflection on problems experienced by the institution. Consequently, an institution's awareness of the importance of good social trustworthiness during periods of shocks results in an institution's incentive to revamp the system of trust in auditing (Power, 1997, p. 8-9). Over time, auditing has endured various remedies to support overcoming its strained social position. One out of many instruments that institution implemented to achieve stabilization of undermined trust level was carried out by utilization of IT. The implementation of IT aimed at

preventing mistakes and supporting auditors during engagement tasks, which ended up increasing the control over procedures and efficiency.

According to Power (1997), the character of an *essentially obscure* auditing process prevents audit practitioners from defining what '*epistemically*' is meant by a good audit, and what brings that quality to auditing. The problem of understanding and determining the benchmark for audit quality is, in traditional (manual) auditing, problematic because of obscurity, since practitioners are incapable of defining what quality is, other than those made by their own performance, which leaves intact the problem of knowing what audit quality is (Power, 1997, p. 30). Over time, the use of IT, in fact, has become a representation of audit quality, due to the contribution and control that it has brought to audit procedures, since incomparability of procedures across practitioners and firms has blurred general understanding of quality. In this regard, IT has created transparency through which general opinion on audit quality becomes a reflection of the IT system used by audit firms.

A continuous increase of transactional information (Vasarhelyi, Alles, Kuenkaikaw, & Littley, 2012) in today's fast-paced economic environment have increased managements' and stakeholders' needs for better and timely assurances of reliability of financial information. The assertion that traditional auditing techniques no longer provide sufficient assurance seems to be a viable indicator of the requirement for the implementation and use of IT. Onions (2003) argued that this is because traditional audit methodologies no longer provide the integrity between transactions and reports, as reviews might be too belated to prevent fraudulent transactions and misleading decisions. The use of IT also refocused the aim of audits towards assessment of risks, which enabled occupying a different perspective of understanding a client's business (see e.g. Banker et al., 2002; Bierstaker et al., 2001; Omoteso et al., 2010), than was possible with the use of traditional methods. As a result, scholars emphasized that audit automation, which became a consequence of the use of technology, has the capacity to strengthen: (1) credibility (Omoteso et al., 2010), (2) accuracy and (3) timelines of auditors' reports (Banker et al., 2002), and therefore, contribute to audit quality. Studies here also depicted that the extent of the use of IT varies across audit firms' sizes. It is impacted by the extent of mundane tasks, where technology gives an opportunity to practitioners to efficiently execute technical (Janvrin, Bierstaker, & Lowe, 2008) and afterwards analytical tasks.

Computerization is argued to provide comprehensive possibilities for enriching descriptive details of organizational records as it enhances classification, brings together, and systematizes business data across types and functions (Kallinikos, 2010). The premise held by

this *socio-technical* proposition is that the outcomes, such as productivity of employees and job satisfaction could be jointly optimized by manipulation of social and technical aspects of the observed context (Davis & Taylor, 1986; Trist, Higgin, Murray, & Pollock, 1963). As a consequence, the implementation of IT inspired researchers to investigate the implications on different aspects of the auditing process. This body of knowledge has been based on the general argument that audit firms and clients should be electronically harmonized, but that technology has, and will continue to have a dramatic influence on every phase of the audit process (Bierstaker et al., 2001).

Therefore, scholars have investigated implications of utilization of IT on integral elements of auditing. Particularly, literature has provided discussions on implications of technology in the following aspects: audit tasks, processes, practitioners and their performance, audit firm's organizational structure, and stakeholders (see e.g. Banker et al., 2002; Bierstaker et al., 2001; Boritz & Hunton, 2002; Brazel, Agoglia, & Hatfield, 2004; Ellis et al., 1991; Ghasemi, Shafeiepour, Aslani, & Barvayeh, 2011; Omoteso et al., 2010). Overall, researchers have asserted that implementation of IT is driven by practitioners' incentives to increase efficiency and effectiveness, in order to shorten the engagement time, facilitate performance, and enhance quality of audit reports.

In more detail, literature has also discussed capacities of different audit tools (aids) and their impacts on audit tasks and auditors. They have outlined three groups of implications of audit tools on practitioners. First, audit tools alleviate the structure of audit tasks and enable practitioners to systematically approach the overall engagement process. Second, tools enable auditors to focus on crucial aspects of engagement as they facilitate practitioners' thoughts. Third, they ensure consistency between decision makers and decision situations (see e.g. Abdolmohammadi & Usoff, 2001; Brown & Murphy, 1990; Caglio, 2003; Green & Choi, 1997; Greenstein & Diane, 1997; Lenard, Alam, Booth, & Madey, 2001; Lenard, Alam, & Madey, 1995; Pedrosa & Costa, 2012; Pieptea & Anderson, 1987). All three aspects have been observed from the perspective of productivity and efficiency gains as the benchmark for audit quality, but also profitability of audit firms. This body of knowledge has occupied the perspective that technology has an opportunistic character, because it has the capacity to rid an auditor of almost any mundane task. However, technology should not be simply viewed only as a contributor to productivity and quality of auditors' procedures and reports. IT might also have a *symbolic* value for audit firms in relation to market competitiveness, which should play a role

in enhancing audit firm's promotion (Manson et al., 2001) and increase the presence of technology in practice.

Literature has shown that different audit tools and mechanisms, such as checklists, decomposition and mechanical aggregation etc. might organize auditors' tasks as they facilitate practitioners' cognitive capacities and contribute to structuring their assignments (see e.g. Abdolmohammadi, 1991; Arnold, Collier, Leech, & Sutton, 2004; Bonner, Libby, & Nelson, 1996). In response to that, researchers have also explored practitioners' perceptions in relation to the relevance of implementation and use of audit tools in audit engagements. Particularly, they explored how audit tools impact the quality of materiality judgments, and practitioners' reflections on impacts of tools in formatting the judgment (see more e.g. Abdolmohammadi, 1991; Arnold et al., 2004; Bonner et al., 1996; Carpenter et al., 1994; Chang & Hwang, 2003; Eining, Jones, & Loebbecke, 1997; Hodge, 2001; Janvrin et al., 2008; Lowe & Reckers, 2000; Lowe, Reckers, & Stacey, 2002; Swinney, 1999).

Ashton and Willingham (1988) found that, in general, audit tools support decision-making processes as they reduce the risk of bias and omissions into which auditors might fall if manual procedures are conducted in risk-based auditing. This is because the occurrence of omissions and bias is more likely under manual decision-making procedures (Abdolmohammadi & Usoff, 2001; Manson et al., 1997). In addition, different levels of auditors' proficiency with IT across different ranks impact the level of exposure and reliance on technology. Studies have found that lower-ranked (e.g., entry-level, junior and senior) auditors are recognized as proficient users of technologies. This is due to their significantly higher exposure to IT subjects during formal education compared to more experienced audit staff (Chang & Hwang, 2003).

Abdolmohammadi (1991) stated that lower-ranked auditors, unlike superior audit staff (e.g., managers and/or partners), in fact, do not have the opportunity to manually conduct their tasks. This is because experienced staff impose technology on subordinates (lower-ranked) as they consider them to be prone to poorer decisions, since subordinates occupy a lower level of auditing (Arnold et al., 2004) than IT expertise. Similarly, Arnold et al. (2004) asserted that audit tools mitigate bias in experts' but aggravate bias in novices' decision making processes. Regardless of those findings (Ashton, 1990; Elliot & Kielich, 1985; Muir, 1987), studies have argued that besides the relatively infrequent use of audit tools (Janvrin et al., 2008), but due to the conservative nature of audit firms, auditors tend to overly rely on the outputs of used aids,

and particularly on those that are negative (Swinney, 1999). As a result, auditors consistently tend to adjust their own judgments to those generated by the IT system.

Following Zuboff (1985; 1988), Kallinikos (2010:2) stated that "information technology is predominantly a means to streamline and procedurally simplify organizational operations and speed up the accomplishment of organizational tasks." But what is considered as efficient or performance gaining is the outcome of a particular social order and the interests it accommodates and renders legitimate, thus what is gain for some, might be perceived as a loss for the others (Kallinikos, 2010:2). Therefore, rather than dissocializing, IT in the auditing context is considered as a groupware artifact that should facilitate interpersonal communication and collaboration between engagement team members (see e.g. Ellis et al., 1991; Vandebosch & Ginzberg, 1996-1997). Thus, there is a question of how interaction and communication unfold between auditors at different audit ranks within the same audit team. This part of the thesis discusses this question to understand the interactions between audit team members across different audit ranks affected by the utilization of ICT.

To this end, studies have fundamentally omitted investigating impacts of audit quality driven ICT utilization on interpersonal relations and communication between audit engagement team members. First of all, previous literature did not categorize auditors' opinions in relation to the use of IT. Second, literature has not focused on comparing the utilization of IT and specific tools and the implications they have on users across different ranks. And finally, the literature has not emphasized the importance of interpersonal relations and communication between auditors, in particular the impact of ICT on breakdown of inter-subjective interactions. To fill these gaps, in the exploratory part of the overall work, I discuss auditors' reflections on the use of technology across audit ranks, where findings will enable narrowing down, opening and introducing alternative methodological approaches to the studies on accounting and auditing, which will allow me to thoroughly examine the structure and evolvement of interpersonal relations and networks existing within the context of auditing.

Collaborative and intergroup relations in auditing

A significant space in the literature on relations between auditors and their clients has been given to a recently growing body of research related to reasons behind clients' selection and the change of auditors (Addams, Davis, & Mano, 1996; Almer, Philbrick, & Rupley, 2014; Beattie & Fearnley, 1995; 1998; Ettredge, Li, & Scholz, 2007; Fontaine et al., 2013; Johansen & Pettersson, 2013; Magri & Baldacchino, 2004; Neveling, 2006; Whisenant, 2003; Woo & Koh,

2001). An emerging body of literature has attempted to identify drivers which condition the emergence of relations between auditors and their clients regarding auditor selection and change. This has resulted in conflicting findings. Initiated by Eichenseher and Shields (1983), researchers identified that both audit fees and interpersonal relations between clients and auditors are the main factors that impact clients' selection and the change of auditor. The studies developed afterwards have been centered on the argument that either audit fees or interpersonal relations play role on the selection of the auditor. In the evolvement of the topic, studies have reported that audit fees were the most frequently cited reason to initiate the change of auditor (Beattie & Fearnley, 1995; 1998; Brazel & Bradford, 2011; Ettredge et al., 2007; Whisenant, 2003). However, actual changers reported that reselection was based on decreased quality of auditor-client relationship (Addams et al., 1996; Magri & Baldacchino, 2004), usually understood as the auditors' availability to their clients (Fontaine et al., 2013). Literature has recently emphasized that demand-side mechanisms for auditor selection, besides the internal network of independent supervisory board members (Johansen & Pettersson, 2013), might be focused on reputation (Magri & Baldacchino, 2004). However, no study has yet examined whether and how reputation impacts the auditor selection process.

To establish the platform for interpreting the concept of evolvement of social relations and networks, I employ the strategy of identifying reviews that in some way have been concerned with the concept of relations (see e.g. Allison, 1994; Ball et al., 2015; Goodwin, 2003; Goodwin & Yeo, 2001; Herda & Lavelle, 2013; Myers et al., 2003; Raghunandan et al., 1998; Raghunandan et al., 2001; Rezaee & Lander, 1993; Scarbrough, Rama, & Raghunandan, 1998). I looked at the literature that discussed collaborative, co-operative, and service provider/client relations across internal and external audit functions to gather a broader understanding of drivers that bring those relations to emergence. In particular, the aim of this literature review was to identify how researchers understand the evolvement of relations and what is the character of drivers that formulate a particular social selection model (Lusher et al., 2013). Since the articles mainly focused on the exchange of benefits as drivers for relation emergence across various groups of social actors, and intentions to assimilate with those whom one establishes relationship with, what particularly caught my attention was the lack of clarity regarding how actors' characteristics play a role in determining the emergence of relation. Literature presented here depicts both the theory and rationale behind papers 2 and 3, as it emphasizes the pertinence for implementation of another methodological tool for research on accounting and auditing, as well as related theories behind the implementation of the methodological tool to answer particular research questions.

Since the aim here is to identify how and to what extent the research field has recognized the importance of social actors' attributes as drivers of relation emergence, apart from the exchange of interests as their outcomes, I categorize the research field based on the actors that establish different types of relations. Literature in auditing has examined and discussed relations between the following homogeneous and heterogeneous groups of social actors: (1) internal and external auditors; (2) senior management and internal auditors; (3) internal auditors and audit committees; (4) auditors within audit firms; and (5) external auditors and their clients. Although contexts in papers 2 and 3 refer to the two latter categories, it is relevant to identify the broader extent of drivers playing a role on the emergence of relations in auditing.

Literature has primarily emphasized that collaboration between internal and external auditors is beneficial to both groups (CAQ & TheIIA, 2015; ECIIA, 2013; Glass, 2005; NAO, 2011; SAS, 1995). They discussed the purposefulness of collaborative relation between internal and external auditors regarding the benefits they might provide to one another as the outcome of their relation. The relevance of emphasizing the cross-organizational collaboration has evolved from the idea that both previous functions dispense similar purposes of serving diverse stakeholders, thus good co-operation might maximize efficiency of both groups (NAO, 2011), but also contribute to the quality of those to whom they serve, e.g., audit committee and corporate governance (ECIIA, 2013). However, relations here are, to a large extent, conditioned by the outcomes and provision of service as benefits to social actors.

On the other hand, Sarens and De Beelde (2006), while examining collaboration between senior management and internal auditors, argued that positive perception of collaborative relation is a result of the match between expectations and satisfaction of those expectations by those that form the relation. This study showed that requirement, expectation, and dedication to satisfy needs comprise good collaboration, but that relations are, in general, driven by incentives to exchange potential interests between groups.

A third group of studies investigated relations between auditors and their clients (see e.g. Ball et al., 2015; Herda & Lavelle, 2013; Myers et al., 2003). Studies here discussed the impact of tenure on the quality of relation as their outcomes. In addition, these studies showed that a good relation might result in value-adding services that auditors could provide to their clients. Initially, this literature emphasized that quality of collaborative relation may be regarded as personal (behavioral) characteristics of actors assembling that relation, and that those personal characteristics might play role in providing provision to the users of the service.

Fourth, relations between internal auditors and audit committees have also been the object of research in some studies (see e.g. Allison, 1994; Goodwin, 2003; Goodwin & Yeo, 2001; Raghunandan et al., 1998; Raghunandan et al., 2001; Rezaee & Lander, 1993; Scarbrough et al., 1998). Literature has outlined that collaborative relations between audit committees and internal auditors depend on the structure and prudence of members belonging to both groups, which impacts the extent to which the members of the either group intend to support the work of others (Raghunandan et al., 1998; Raghunandan et al., 2001). In this regard, they outlined that both assemblage and personal characteristics play a role as a driver in relations.

Fifth, Morrison's (2002) example of newcomers' socialization process in audit firms showed that relations might result in assimilation of those that establish relations. The objective of the research was to shed light on the role of relationships on knowledge exchange and assimilation, while linking socialization outcomes to social network structure. She argued that the structure of social relations that auditors establish with other auditors determines the extent of their knowledge, which implies that they tend to acquire other actors' characteristics. She also emphasized that utilization of social network methodology might enrich the overall understanding of the assimilation process by observing structures of social networks, particularly within organizations (Morrison, 2002) and beyond.

This part of the research provides a bridge between two arguments that resulted from two distinct groups of literature and asserts that relations are not only driven by the exchange of interests, but they also tend to account for subjective characteristics of social actors when it becomes a question of *with whom* to relate. This research is relevant, as it emphasizes the importance of taking actors' attributes into account as variables that determine the emergence of relations, besides subjective interests and their exchange. In addition, the research here observes relations through their structure provided in the form of a network, and aims at testing the argument both within the same group (homogeneous) and between members belonging to different groups (heterogeneous).

Overall, this stream of literature has emphasized that client's perception of the quality of inter-subjective relationships plays a fundamental role on auditor selection and mainly determines reasons for re-selection. As underlined in the thesis, the concept of social relations in the audit context has been primarily observed through collaborative and co-operative relationships established with the aim of exchanging benefits. Conversely, studies have not yet discussed the factual relational aspect of such collaborative and co-operative relationships from

the perspective of the social selection process which are conditioned by the actors' attributes, and not the general exchange of benefits, e.g., services. To a large extent, I have been inspired by the *actor relation effects* (individual attributes) that drive the social selection process, rather than network self-organization principles (Lusher et al., 2013, p. 26). My methodological critique is that researchers have already formulated the setup through which the network organization principles could be observed, but the results from the investigations largely circumvent the discussion on how or to what extent actors' attributes, and similarities in actors' attributes (homophily) in the complexity of social structures precondition the formation of relations (McPherson et al., 2001). To synthesise the previous, we cannot solely observe the exchange of benefits as the "theoretical outlook" of the relations and networks. Instead, we need to integrate social actors' (subjective) attributes into the dialog with both theory and practice to augment our understanding of reality.

Methodology

For the purpose of developing individual research articles, I utilized a combination of research strategies to enrich findings and answer particular research questions. I combined the grounded theory approach as an analytical tool and case study research strategies to generate empirical material through interviews and archival data. In the following section, I describe the ontological and epistemological assumptions together with procedures and rationales for employing different research strategies across the research project, and methods I utilized to analyze empirical data.

Ontological assumptions

Following Guba and Lincoln (1994, p. 105) - "*questions of method are secondary to questions of paradigm*," which they define as "*the basic belief system or worldview that guides the investigator, not only in choices of method but in ontologically and epistemologically fundamental ways*." The investigations of a broad range of topics in various social studies have their ontological origins in two ancient Greek philosophies. Over time, both of those paradigms have evolved and been integrated into the social studies of accounting and auditing, in the form in which researchers, usually implicitly, employ them in their studies.

In general, the two main philosophical paradigms, that give foundations to almost any modern research, are social *constructionism* (also called phenomenology, interpretivism and/or subjectivism) and *positivism* (Remenyi, Williams, Money, & Swartz, 1998). Constructionism is grounded and follows the interpretivist philosophy as it focuses on and emphasizes the importance of understanding the subjective meanings that individuals give to a particular phenomenon, which, in turn, motivates their actions and enables researchers to understand those actions (Saunders, Lewis, & Thornhill, 2012). In other words, the objective of the research lies on the primacy of subjective consciousness that propagates studying experiences in which subjective behavior is perceived to be determined by the phenomena of experience rather than external, objective and physically described reality (Remenyi et al., 1998).

The positivistic ontological paradigm assumes that researchers work with an observable and objective social reality and that the end product of such research takes the form of e.g. law-like generalizations, similar to those produced by the physical and natural sciences (Remenyi et al., 1998). Overall, a general distinction between the two paradigms is in the locality of the

reality, which could either be inside or outside (dependent/independent) an individual's interpretation of that reality.

Over time in both schools of thoughts, there was a strong tendency of seeing both traditions as reflecting different ontological positions. As a result, the scientific discussion on the evolution of two different philosophical paradigms has brought about an exaggeration of the divergences between them, and as a consequence, they became mutually exclusive paradigms (Bryman, 1998, p. 105) that led to an exclusive adoption of qualitative or quantitative methods within research.

Accordingly, Filstead (1979, p. 45) argued, *"qualitative and quantitative methods are more than just differences between research strategies and data collection procedures, these approaches represent fundamentally different epistemological frameworks for conceptualizing the nature of knowing, social reality, and procedures for comprehending these phenomena."* Although the previous argument emphasized that the adoption of the particular research method goes beyond the research strategy and has its roots in the principal nature of knowing and paradigms standing behind the knowing as such, recent discussions have indicated that the difference between paradigms has been reduced to mere technical matters, i.e. primarily depending on their suitability with the particular research question (Omoteso, 2006). This means it is no more surprising that researchers claim a positivistic standpoint and use phenomenology and *vice versa* (Remenyi et al., 1998).

Consequently, despite the existing traditional standpoints related to critics of incompatibilities between paradigms, the developing body of knowledge on ontological and epistemological discussions of compatibilities among the two ancient paradigms have enabled researchers to defend the argument of combining the practical aspects of two paradigms. Practically, this means that selection of a particular paradigm does not necessarily entail a certain group of tools available to researchers, but also the selection of those tools that have not been previously considered as an integral part of a particular paradigm. Therefore, since researchers have recognized this as a rather technical question than an issue with the nature of knowing as such, it seems viable to cross-paradigmatically combine available tools within a single piece of research, which is the case of this Ph.D. dissertation. The body of the dissertation consists of three individual papers none of which combine two previously depicted ontological assumptions, while the dissertation as a whole embraces findings that are reached through both paradigms; this discussion was necessary to provide reconciliation within the synopsis.

Based on the previous assertion, this dissertation has philosophical underpinnings in the combination of constructivism and positivism, which enables bringing together both independent subjective observations (constructivism) to a large sample size (positivism), which increases general understanding of observed theoretical abstraction. Saunders et al. (2012) named this philosophical standpoint as an *integrated research paradigm*. This paradigm gives the researcher a capacity to occupy the middle position between two main philosophies of science, and enrich the understanding of the observed phenomena. Consequently, to combine two paradigms, constructivism or positivism, is no longer recognized as unacceptable, thus allow researchers to navigate through previously opposite standpoints.

The overall aim of this dissertation is to investigate social relations and the nature of social network emergence in the context of mandatory assurance services, and it is grounded on the ontological assumptions that *relations between social actors are identifiable entities, whose co-existence is reciprocally interdependent*. This assumption implies that relations are (1) interdependent on one another, and (2) there is a subjective reflection on those relations that brings relations to emergence. In other words, social actors establish relations according to their subjective interpretation of others, and all relations have the capacity to be observed separately from social actors who make those relations, which are integrally interdependent.

Epistemological approach

Omoteso (2006) distinguished between two epistemological approaches that are typically used in studies on the impact of ICT in auditing considering their implications on organization and inter-subjective interactions: (1) qualitative and (2) quantitative. As will be thoroughly elaborated, in this dissertation I introduced an instance of the issue of disruptive ICT as the motor to initiate the exploratory part of the study, which I further extend with the question of relations and social network issues that emerged from the initial part of the research process.

Taking into account that studies in auditing, so far, have had inclinations towards either one of these approaches based upon background and proficiencies of researchers in question, a sensibility or a preference towards either manner of understanding the phenomena might, in fact, constrain the process of understanding the issue due to the limitations of a selected approach. In such a way, researchers that stand behind the interpretivist beliefs seek to comprehend the subjective meanings of social phenomena and, thus, concentrate on details of a distinct situation, the reality behind the observed details and subjective meanings that motivate concrete action. For instance, they foster a focus on humans and their roles within different

situations as the *social actors* and tend to explore and interpret differences that exist between them, which are caused by divergences in their individual interpretations of the focal reality and acts incurred by those different interpretations (Saunders et al., 2012). On the other hand, researchers supporting a positivistic perspective contend that only those phenomena that are observable have credibility to produce reliable facts. Such a perspective focuses on the causalities between theoretically determined variables that will enable developing law-like generalizations (Remenyi et al., 1998) where observed phenomena become intentionally reduced to its simplest (abstract) elements to provide their manipulation. These studies tend to focus on external and independent facts rather than subjective impressions, and the notion of '*observable social reality*' is consistent with those facts (Remenyi et al., 1998; Saunders et al., 2012). It is crucial that a researcher is entirely independent from the observation and the unit of the analysis, therefore, should neither affect nor be affected by the subject of research (Remenyi et al., 1998). By having emphasized the previous distinctions, it is possible to argue that there is a certain tradeoff between these two epistemological approaches, and researchers' inclination towards either of them might hinder completeness of understanding the specific research phenomena (Bryman, 1998; Remenyi et al., 1998; Omoteso, 2006).

This dissertation explores different aspects of relations and social networks' structuring principles from the perspectives of significance of modernity, reputation and identity in relation with the emergence of interactions and relational ties, as well the specificities of relations as the unit of the analysis. The results of the study inform practitioners about insights that will enable them to better understand how and why social actors, both individually and collectively, perceive the environment and reflect upon the changes within it to establish relations with those others with whom they share the environment, what is the nature of the network structuring principles in totality of the observed context, as well the implications of network configurations on different social constructs. At last, this is an explorative study as it aimed at investigating the current implications and possible further directions of changes of the focal context, and it aims at taking stock of the current situation rather than providing voluminous solutions on the emerging issues.

Research design

In order to build the grounds for the Ph.D. project on solid theoretical foundations, I initiated the overall research process by undertaking the step of identifying the current state of the art in theories of auditing, in particular, the assurance service context, in order to set the baseline for

my theoretical and empirical work in each individual article. Previously depicted theoretical background represents the outgrowth of that preliminary work, based on which the multifaceted disposition of the research design was established and further unfolded. In the following section, I present the research design that evolved as a part of the process by describing data collection and analysis methods, which I employed within the dissertation.

The research design of this Ph.D. project has evolved *"in interaction with the context in which the study is being conducted, rather than simply being a fixed determinant of research practice"* (Maxwell, 2012, p. 7). In the initial stages of the work on this dissertation I adopted the *emergent research design*, which, according to Morgan (2008), tends to be deployed over the course of the research process in response to what is learned in the earlier stages of the research. In other words, this approach implies that the research process has an iterative nature, and emphasizes that data analysis should be conducted continuously during the collection phase as such an approach improves the research procedure and interview protocols on an ongoing basis. However, Morgan (2008, p. 246) emphasized that *"no study could be completely emergent: instead, emergent design allows for an ongoing reassessment of how to conduct the research based on what has been learned from prior data collection and analysis"*, and *"even the most flexible qualitative study begins with some ideas about what to observe."*

Following that "the actual data collection techniques, as well as the topics covered, can also shift and evolve as part of an emergent design" (Morgan, 2008:246), I adopted the research design that, overall, combined (1) interviews and (2) archive data mining, in order to collect and analyze cross-sectional data, and provide answers to theoretically determined research questions. For the analytical part, I drew inspiration from the grounded theory approach (Corbin & Strauss, 1990, 2008; Glaser & Strauss, 1967) and theory building from the case study research (Eisenhardt, 1989) to approach the data and derive preliminary results.

Qualitative interviews, grounded theory and inductive methodology: methods for data collection and analysis

For the overall dissertation, I selected the Danish field of auditing service as the principal empirical context of the research, but with a particular focus on assurance services. The rationale behind such a selection was to eliminate potential disturbances in research findings that could have emerged if other professional services provided by audit firms were simultaneously or comparatively observed across the range of services offered by, primarily, Big 4 auditing firms.

For the exploratory part and paper 1, I employed interviews as the method to generate empirical data. Interviewing technique, as a data collection method, is defined as *a purposeful discussion between two or more people* (Kahn & Cannell, 1957) *when one person (an interviewer) asks questions of another person (a respondent)* (Polit & Beck, 2006), *which are carried out to serve to the researcher's ends* (Brinkmann, 2008). Regardless of the fact that interviews are one of the most commonly used methods for data collection (DiCicco-Bloom & Crabtree, 2006), a researcher should consider whether such a method intends to provide an adequate approach to answering the research question (Brinkmann, 2008; Saunders et al., 2012). Bearing that in mind, I focused on interviews since this approach was expected to provide the most valuable insights to the research problem related to practitioners' *perceptions* of the impact of technology on the unfolding of interaction and communication.

In particular, research interviews could be classified as more or less structured (Brinkmann, 2008), and based on the level of formality and structure, interviews could be classified as structured, semi-structured to unstructured (Saunders et al., 2012, p. 320). Other typologies exist as well (see more: Healey, 1991; Robson, 2002). For this study, I utilized semi-structured and in-depth interviewing techniques as they enabled me to capture interviewees' perspectives on the phenomenon of interest, where both of those fall into the group of non-standardized one-to-one interviewing methods.

Employing the semi-structured interviewing technique enabled me to discuss and clarify present issues, which were further discussed with participants in depth. Semi-structured interviews are typically organized in a series of questions prepared in the form of interview guides (Bryman, 2004, p. 543) that aim at focusing on a specific topic of discussion (Brinkmann & Kvale, 2015). On the other hand, in-depth interviews are, likewise, valuable when detailed information about a person's thoughts on a particular phenomenon need to be thoroughly explored (Boyce & Neale, 2006). This technique is appropriate for exploratory studies as it gives the opportunity to ascertain current occurrences and enable exploring new insights (Robson, 2002, p. 59).

All interviews were conducted face-to-face, with some via Skype interviews. Although, methodological literature has been critical of the use of phone interviews as a medium for qualitative interviewing because of the: (a) inability to achieving '*rapport*' in the social encounter, and (b) loss of visual and non-verbal cues (Irvine, 2010), arguably the lack of social encounter has been replaced by the presence of live video transmitting platforms that provide visual and non-verbal cues. In total, I collected 16 semi-structured and in-depth interviews over

2014 and 2015, lasting approximately 45 min – 1.5 hours each. Afterwards, all collected interviews were audio-recorded, transcribed (Brinkmann, 2008), and returned in a textual form to participants to confirm plausibility and accuracy of the data before the analysis started.

In particular, I carried out an exploratory type of study (Saunders et al., 2012). An exploratory study is characterized by a relatively flexible and unstandardized approach to the interviewing process (Cooper & Schindler, 2008), which permits adjustments and improvements on interview protocols in order to navigate through emerging topics and issues worthy of exploring in-depth.

The procedure for selecting the sample of participants was carried out through the combination of convenience and snowball sampling techniques (Eisenhardt, 1989). Convenience sampling is a method for selection of participants based on the accessibility of members from the observed population (Saunders et al., 2012, p. 241). In this case, for the first round of interviews I selected participants that were, or still are, in a co-operative relation with some of the members, or are associated with the Danish Audit Research Network (DARN). I exploited that possibility to enter the empirical space of my main interest, and become familiar with the current movements in the audit industry and generate preliminary findings. Since the sole use of convenience sampling method might be prone to bias, I then asked the initial participants to refer me to their fellow practitioners who would be able to provide specific reflections on the emerging issues (snowball sampling), and whose work would be more relevant for my research interests (Eisenhardt & Bourgeois, 1988; Miles & Huberman, 1994). Snowball sampling, as a non-probability sampling method, might also be problematic due to its inclination to bias. This is because respondents might be likely to refer other respondents who are similar to them, which might result in a relatively homogeneous sample (Ashcraft & Ashcraft, 1993). However, both selected techniques are considered appropriate for an exploratory study (Miles & Huberman, 1994) given that multiple clusters of participants were incorporated into the study, and further reflections on generalizability of findings are elaborated in the evaluation of results.

Considering that I did not have any previous experience, nor was previously exposed to the professional auditing environment, my approach to the preliminary participants was less particular and rather more general. Concretely, I placed the essential research interests into the more generic problem of the *utilization of ICT into assurance services*. Thus, my initial interview protocols mainly included general questions, which enabled me to touch upon different aspects of the principal problem based on the theoretical knowledge, and also, to

further unfold my interests into a particular direction that evolved through the first stage of data collection and analysis. This was due to the fact that previous literature primarily touched upon the topic to a limited extent and from a highly confined perspective, as previously discussed. Arguably, the generic approach of querying broad questions enabled me to better identify the core issues that exist in the current state of the art in the profession, as respondents felt less confined to reflect on rather theoretically centralized issues. In the following, I present some of the questions from the interview protocols that I asked during the initial stages of data collection:

- *How does your organization utilize ICT to approach tasks?*
- *How do you understand the importance of ICT in assisting your work?*
- *How has your work changed over the past few years in relation to utilized technologies?*
- *How does the assistance of ICT affect your interaction with members of your engagement team?*

An initial stage of the data analysis started with the first collected piece of data. Each exploratory interview was transcribed and stored in a dedicated database. Secondary data were separately collected to further inform the interviewing process, e.g., presentations, power-point files etc., and those were also uploaded to a particular folder. To build, organize and systematically approach the analysis of collected data, all transcribed interviews, together with the secondary data, were integrated into NVivo software (Given, 2008) version 10.1. The software has the capacity to enable a researcher to discover and map relationships within qualitative data, categorize them, dedicate codes of abstract concepts, facilitate interpretation, and draw results.

The analytical phase of the process entailed two coding stages, which were inspired by the grounded theory approach. I started the analysis with *open coding* in order to analytically break down the collected data and initiate the interpretative process. Based on the topics discussed with practitioners, I developed a list of abstract concepts associated with contextual events identified in the data and compared them for similarities and differences across the events. Then, I looked for similarities between abstract concepts in order to develop categories, which were again tested against the data (Corbin & Strauss, 1990, 2008 Miles & Huberman, 1994). Following the categorization process, I developed the network amongst abstract concepts (*axial coding*) in order to facilitate interpretation of results. The entire coding process was conducted line-by-line through transcribed interviews and secondary (archive) material

(Nardelli, 2014). Such a method represents the fundamental step of the overall data analysis in this dissertation.

Notwithstanding, the grounded theory approach, as stated earlier, does not hold the integrity for theory building in the paper 1 as it was utilized as the analytical tool, thus the approach as such is not going to be explained here in detail. Rather, the approach was used to inspire the process of data analysis, but also because the employed research design of theory building based on the case study (Eisenhardt, 1989) is compatible and holds foundations in grounded theory (Corbin & Strauss, 1990, 2008). Therefore, it is worthwhile to provide fundamentals of the grounded theory in regards to how particular aspects of it have been integrated in this work. In the following, I give an outline of the well-known eleven canons (Corbin & Strauss, 1990, 2008), together with their definitions, and I briefly explain how each of them have been utilized as an analytical tool for my empirical work.

Table 3 - Canons and procedures of grounded theory applied as an analytical tool in this Ph.D. thesis

	Canons	Procedure	Application in this dissertation
1	Data collection and analysis are interrelated processes	The analysis begins as soon as the first bit of data is collected. Analysis is necessary from the start because it is used to direct the next interview and observation.	Data analysis and open coding did not start as the data collection was terminated, but right after the first interview; yet, interview protocols have been continuously updated even during data collection.
2	Concepts are the basic units of the analysis	A theorist works with conceptualizations of data, not the actual data per se. The incidents, events and happenings are taken as potential indicators of phenomena, which are given conceptual labels.	All incidents, events and happenings were epitomized into concepts, constructs or phenomena through two coding stages - open and axial - line-by-line coding.
3	Categories must be developed and related	Concepts that pertain to the same phenomenon may be grouped to form categories, which are more abstract than the concepts they represent. Over time, categories may become related and form a theory.	The exported concepts, constructs and phenomena were used to identify relationships between them, which were visualized through networks of related codes to enable categorization.
4	Sampling in grounded theory proceeds on theoretical grounds	Sampling in grounded theory rather proceeds in terms of concepts, their properties, dimensions, and variations than by random or independently from previously collected data and derived findings.	I applied this canon partially for the study and only in relation to interview protocol adjustments, rather than interviewees. Protocols were adjusted based on the emerging issues, while theoretical sampling of interviewees was applied in later stages to go in-depth on the previously emerging issues.
5	Analysis makes use of constant comparisons	Incidents, when noted, should be compared against others for similarities and differences. Making comparison assists the researcher in guarding against bias, helps to achieve greater precision and consistency.	For each emerging incident, event and happening a group of related codes was used to visualize the network, which are mutually compared with others to ensure consistency and precision before final findings were derived.
6	Patterns and variations must be accounted for	Data must be examined for regularity and for an understanding of where that regularity is not apparent.	To determine the existence of contrasting data, I looked into the patterns of networks to identify deficiencies in concept networks belonging to the same event.
7	Process must be built into the theory	Process analysis can mean breaking a phenomenon down into stages, phases, or steps. Process may also denote purposeful action/interaction that is not necessarily progressive, but changes in response to prevailing conditions.	Application of this canon to my study was insufficient because process study requires longitudinal data, while in this dissertation I have primarily utilized cross-sectional data.

8	Writing theoretical memos is an integral part of doing grounded theory	Memos enable tracking all the categories, properties, hypotheses and generative questions that evolve from the analytical process. They are involved in the formulation and revision of theory during the research process, and writing memos should begin with the first coding session and continue to the end of the research.	During both stages of data collection and data analysis I have generated theoretical memos to further inform and improve initial and later stages of data analysis.
9	Hypotheses about relationships among categories should be developed and verified as much as possible during the research process	As hypotheses about relations among categories are developed, they should be taken back into the field to check out and revise when needed. A key feature of grounded theory is that hypotheses are constantly revised until they hold true for all the evidence.	Considering the dynamic nature of data collection, to eliminate possibility of initiating discussions inconsistent with previous findings, I have controlled the fit of new interview protocols with previously determined relationships between concepts.
10	A grounded theorist need not work alone	Discussions with other researchers often lead to new insights and increased theoretical sensitivity yet increases the probability for collaborative analysis.	The work in progress was presented in informal conversations, seminars and workshops.
11	Broader structural conditions must be analyzed, however microscopic the research	The analysis of a setting must not be restricted to the conditions that bear immediately on the phenomenon of central interest. Broader conditions affecting the phenomenon may include economic conditions, cultural values, political trends, social movements and so on.	While interviewing, I tried to emphasize general problems in order to enforce interviewees' reflections to them from the perspective of the focal issue at stake for the research.

Paper 1 was built on an *inductive methodology* and was grounded on guidelines provided by Eisenhardt (1989) and theory of modernity inspired by Giddens (1990). Induction is defined as *the approach to theory building from the empirical phenomena* (Eisenhardt, 1989; Miles & Huberman, 1994; Yin, 2014), where the process of building the theoretical notions lies in the coding procedures (Glaser & Strauss, 2009). In order to investigate the emerging issue of *auditor-to-auditor* interaction in the empirical setting of mandatory assurance services in Big 4, I collected rich and varied cross-sectional data through semi-structured in-depth interviews and archival data. The case focused on the unfolding of interpersonal interactions when integrating ICT into global auditing methodologies. This study was considered an initial investigation that was necessary to open the research perspective for the following articles. An exploratory part of the study aimed at providing: (1) a better understanding of the social interaction processes existing within the auditing context, (2) identification of the emerging issues, which would enable narrowing down the scope of the research process through examination of practitioners' perceptions and reflections in relation to technology, and (3) possibly extending the research scope towards utilization of new and/or non-standardized methods for approaching the emerging issues (Lusher et al., 2013; Robins, 2015).

The exploratory study facilitated my understanding of the contextual setting and enabled me to narrow down the research focus. Through discussions with practitioners, several major topics related to the auditor-to-auditor collaboration emerged as interviewees repeatedly mentioned: interaction, communications, and *relations*. Importantly, interviews were used as a primary data collection method for paper 1, while for the purpose of approaching the issues that emerged through the interviews (papers 2 and 3) such as *relations* and *networks*, I utilized the research design based on quantitative methodology, as well as different sources of data collection. This enabled me to decrease the risk of biases grounded on multiple or shared use of the same data source across several separate studies.

Deductive methodology, case study, archival data mining and network research: methods for data collection and analysis

The second part of the study was based on *deductive* methodology, which is grounded on Yin's (2014) assertion that such studies should have developed theoretical propositions prior to data collection as a means to analyze data, which emphasizes a number of specific analytical procedures (Saunders et al., 2012, p. 500). To utilize this approach, I applied *pattern-matching* procedure to predict outcomes that were previously built upon the analytical framework

deducted from the existing theory (Saunders et al., 2012, p. 500). For the purpose of the forthcoming milestones in this dissertation, I chose network studies by applying social network analysis (SNA) as a methodological approach, which enabled me to investigate relations and network structuring principles while incorporating characteristics of social actors that comprise the observed network. Despite some branches of more traditional network research approaches accepting the distinction between *dependent* and *independent* variables, e.g. linear regression, where a researcher sets the number of independent variables to suggest the outcome of the dependent variable (Saunders et al., 2012), in the cutting edge statistical approaches for network analysis this is not the case (Lusher et al., 2013; Robins, 2015).

To investigate the unfolding of social relations in the context of auditing in the auditor selection processes (paper 3), first I developed the introductory paper to introduce terms, concepts and methodological approach to the field of accounting and auditing, which is coupled with the empirical example of a collaborative network between audit partners (paper 2). The network methodology has an appealing focus on relationships among social entities and on the patterns and implications of these relationships (Wassermann & Faust, 1994, p. 3). In order to provide an answer to the research question, I found it most appropriate to collect archival data.

I collected extensive cross-sectional data in the form of annual reports from Danish public companies that were listed on Copenhagen Stock Exchange (Nasdaq OMX) in the period from 2010 to 2014. To collect the archival data in the form of annual reports I used several available sources: (1) the companies' official websites - section *investors' relations*; (2) *Virk.dk* - the free access platform of all business entities registry in Denmark, and (3) direct communication (via email) with investor relations representatives from those companies to address missing data in the previous sources.

Considering that network studies require collection of relational data besides particular social actors' attributes, I undertook archive data mining from each collected annual report. For papers 2 and 3, I extracted data about client's auditor selection from the section of *Independent auditor's report*, together with the information about the *board of directors* (supervisory board). For paper 3, I utilized the same data as paper 2, but only utilized the data on auditor-to-auditor collaboration. Those two chunks of data were used to structure relational ties and assemble the focal network (Wassermann & Faust, 1994). The relational ties, as the main unit of analysis, represented the following: (1) in paper 2 relations between two audit partners in collaboration on a single audit engagement; and (2) in paper 3 I simultaneously observed two types of relations, namely: (a) companies where the tie represents the existence of mutual supervisory

board member (*an interlock*), and (b) relations between companies and individual auditors they engage for a single mandatory and official audit engagement. Additionally, to reflect on the source for relational tie emergence, I outlined the list of theoretical concepts to test their influence on relation (network) formation processes, and I extracted that information from collected data, such as affiliation and business entity size etc.

To conduct the data analysis, I utilized two methods from the network studies for two research papers. In paper 2, I applied *classical network approach*, which enabled me to introduce, depict and present quantitative measurements of particular network concepts, separately. In order to produce quantitative measures of each selected network concept and to discuss them in relation with the auditor-to-auditor collaboration network, I utilized UCINET software (Borgatti, Everett, & Freeman, 2002), which is software for general network data analysis.

Each of the theoretical concepts was applied to a unique separate network of audit partners that occupied relational ties (Lusher et al., 2013; Robins, 2015; Wassermann & Faust, 1994) for the period of five years. I selected perennial approach as a single case (Yin, 2014) to enable me to explore the intersection of relational ties both within and across network clusters instead of a single-year approach. As in the case of the latter, I accounted for a lower likelihood of inter-cluster intersections. In the following Figure, I present the visualization of the network produced in Visone (Brandes & Wagner, 2004), on which previously outlined concepts were applied in paper 2. The network comprises ties and nodes (Lusher et al., 2013; Robins, 2015; Wassermann & Faust, 1994) where shapes of nodes are attribute sensitive and depict auditors' initial affiliations, which further facilitates understanding the network structure.

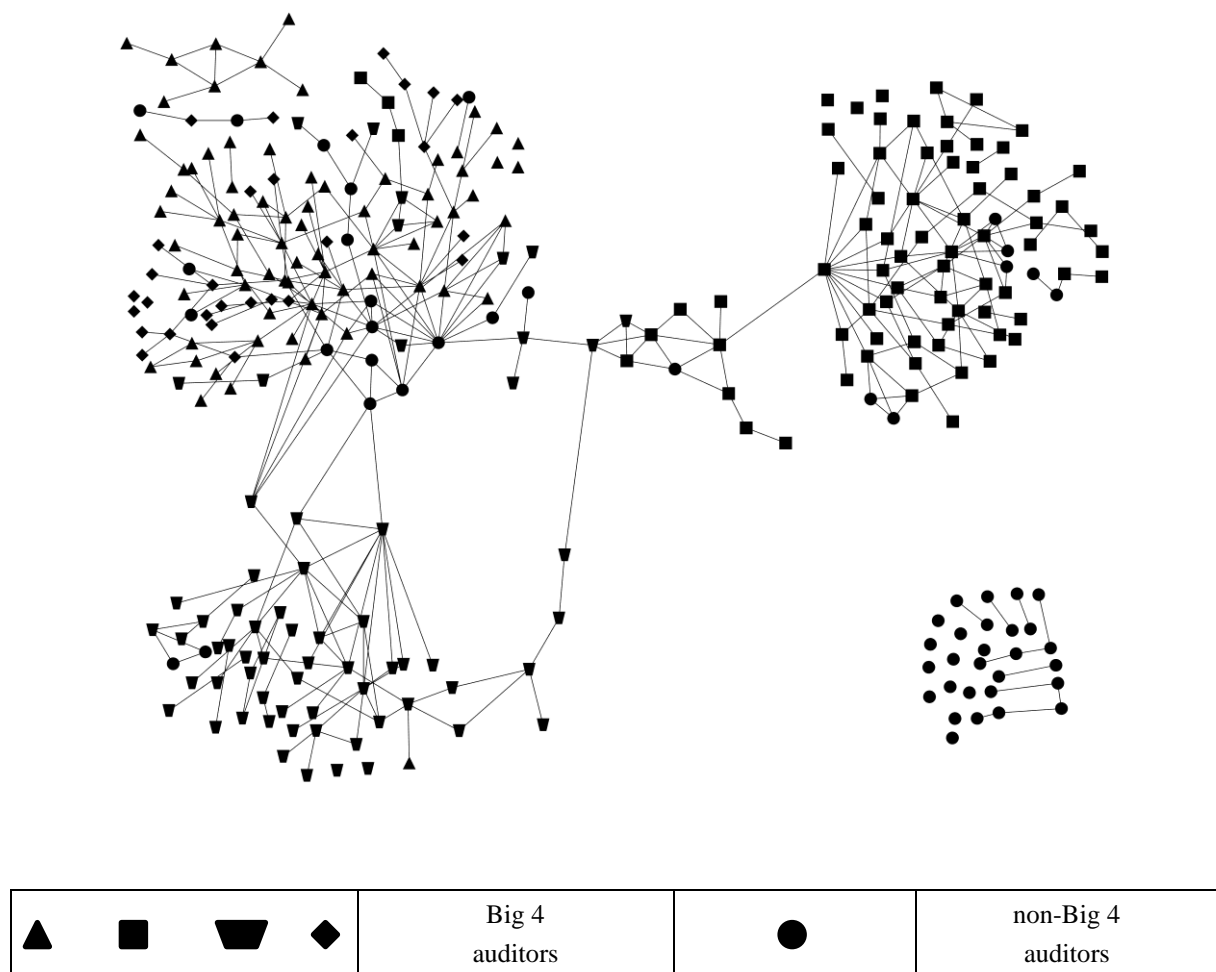


Figure 1 - Visualization of the audit partner collaboration network and affiliation change network ($n = 296$, $x = 718$, $\Delta = 0,8\%$) for the period from 2010 to 2014

In paper 3, I utilized a recently developed statistical method for SNA: ERGMs. Nonetheless, paper 3 employed a deductive approach to data analysis and I analyzed data by using the conceptual frameworks to set theoretical propositions for the empirical analysis. The theoretical framework was based on theories of auditor selection and interlocking directorships, which, as brought together, aimed at providing hypothetical propositions of influences that interlocking directorships have on auditor selection processes. In practice, I reviewed both existing research streams to build the framework, under whose categories I classified social actors, attributes and expected network configurations, which, put together, have provided the definition of theoretical propositions and hypotheses.

Each piece of collected archive material went through the *data mining* procedure in which I extracted previously theoretically determined raw relational and attribute information on each social actor representing the nodes in my distinctive case (Robins, 2015; Wassermann

& Faust, 1994; Yin, 2014). Such raw data were further transferred into the dedicated spreadsheets that were separated for each year for which the estimations of network parameters were developed. In order to prepare the data for analysis, the following steps were necessary. First, raw data from the unique database was anatomized into four disjointed groups of data files, which consisted of two data files representing relations and two groups of data files related to the actors' attributes. For instance, relations included network between companies (clients); and companies and auditors, while multiple attribute files were differentiated between the type of social actors and type of attributes, e.g. binary, categorical or continuous (Lusher et al., 2013; Robins, 2015). To facilitate data manipulation, I converted names of each social actor (supervisory board member and auditor) into a numerical ID, so at that point I terminated manipulation with factual names of individuals. This enabled me to further format the data for the analysis, which consisted of the *matrix-developing* phase. For this data-preparation stage, I utilized Visone (Brandes & Wagner, 2004) as it generates network visualizations and *adjacency matrices* (Lusher et al., 2013; Robins, 2015; Scott, 2013; Wassermann & Faust, 1994), which can be used for statistical modeling. In this example, I developed two adjacency matrices for each year of observation, ten in total. Matrices representing the network of companies sharing supervisory board members were squared, while the auditor selection matrices had rectangular form. Each matrix included in the study was undirected and binary (0 and 1). This is because the theoretically proposed assumption determines that clients select their auditors, and in addition, it was not possible to identify the direction of the interlocking emergence. In addition, SNA prohibits combining different types of ties (directed and undirected) in the same observed network (Lusher et al., 2013). Also, matrices used in the study do not count on weighted relational ties, so 0 and 1 give a representation of the presence or the absence of the relational tie between two adjacent actors (Lusher et al., 2013; Robins, 2015; Wassermann & Faust, 1994).

To adequately capture the structure of the empirical network, I utilized ERGMs (Wang, Robins, Pattison, & Lazega, 2013), which are defined as *statistical models for network structure, permitting inferences about how network ties are patterned* (Lusher et al., 2013 p. 9). In other words, those are statistical models that count for the presence or the absence of a network tie that explicitly takes into account complex dependencies between the observed ties (Robins, 2015). A main assumption behind this statistical model is that the network is built up of small configurations of network ties, akin to dyadic and triadic census, but the range of configurations is not limited to a previous census, and rather includes more complicated structures such as the *k*-star, *k*-triangle and *k*-two-path configurations, which were of primary

focus in paper 3 (Robins, 2015). Network configurations are defined as *a possible small subgraph that may represent a local regularity in social network structure* (Lusher et al., 2013, p. 17). Following Lusher et al. (2013), those configurations can be considered to arise from local social processes but in order to be appropriately selected for ERGMs, as a principled statistical approach to modeling a social network, they should to be theory driven and require that the researcher consider the complex, intersecting and competing theoretical reasons why the social ties in the observed network have arisen. Therefore, ties are arguably dynamic in nature and they arise in response to other ties in their social environment. So, arguably, network approach towards social relations has a good capacity to enable the researcher to focus and examine relations and their interdependence by taking into account actors' attributes that comprise a formal part of that particular network.

ERGMs work on the principle of a pattern recognition tool (Lusher, Robins, & Kremer, 2010), which, besides the *network statistics* (that represent the count of a number of network configurations), determines the network probability as it calculates parameter values for each observed, and previously theoretically underpinned configuration (Lusher et al., 2013, p. 9). The aim of parameter estimations is to provide the extent to which a particular network configuration plays an important role in the process of structuring the network, in relation to other selected configurations. The baseline mathematical formulation of the network observed in paper 3 is given in the following equation, which represents a readjustment of the form provided by Wang et al. (2013), as my empirical case included the top-level (company-to-company) network a and meso-level (company-to-auditor) network x , as presented in Figure 2.

$$Pr(A = a, X = x) = \frac{1}{k(\theta)} \exp \sum_Q \{ \theta_Q z_Q(a) + \theta_Q z_Q(x) + \theta_Q z_Q(a, x) \}$$

Where according to Wang et al. (2013):

- a (homogeneous - company-to-company) and x (heterogeneous - company-to-auditor) are separate network instances.
- Q represent network configurations that are based on the dependence assumption of tie variables.
- θ_Q is the parameter associated with Z_Q .
- $k(\theta)$ is a normalizing constant defined based on the graph space of networks of size n and the actual model specification
- $z_Q(a)$ and $z_Q(x)$ are the network statistic for the corresponding network configuration of type Q .

- $z_g(a, x)$ are network statistics for configurations that involve ties from one of the unipartite network (A) and the bipartite network (X), representing the interactions between two networks.

To ensure a close fit between data and theory, the quantitative approach employed in this study required relatively different treatments compared to the case of paper 1. I conducted the twofold theory/data fit procedure, which comprised *goodness of fit* test of the model estimations (Lusher et al., 2013, p. 179) followed by the comparative test of results from the model estimations (from the hypotheses) with the existing literature and theories previously employed to develop the hypotheses (Saunders et al., 2012). I followed recommendations made by Lusher et al. (2013) that goodness of fit (GOF) in ERGMs is an integral part of modeling procedures as it informs whether theoretically selected combinations of network structures estimated in the model are a good representation of how a particular network could have been formed. In practice, this means that even though the model convergence is achieved, the absence of some particular network structure might cause bad model fit. Following Robins, Pattison, and Wang (2009) and Wang et al. (2013), the network parameters have a good fit to data if t -ratio of the observed network structures and integrated attributes is below 0,1 (range 0 - 0.1) and below 2 (0 - 2.0) for all the other irrelevant network structures, in absolute values.

Finally, in developing models I aimed at testing hypotheses, which were further interpreted both individually and against similar and conflicting findings in the existing literature and theories. Jointly with previous papers 1 and 2, I extensively present comparison of the results of the paper 3 within the *Discussion* and *Conclusion* sections of this synopsis.

In the following Figure, I provide a visualization of the overall data collection and the analysis process. The figure represents the process as linear, while in practice some stages overlapped to a certain extent, as previously described.

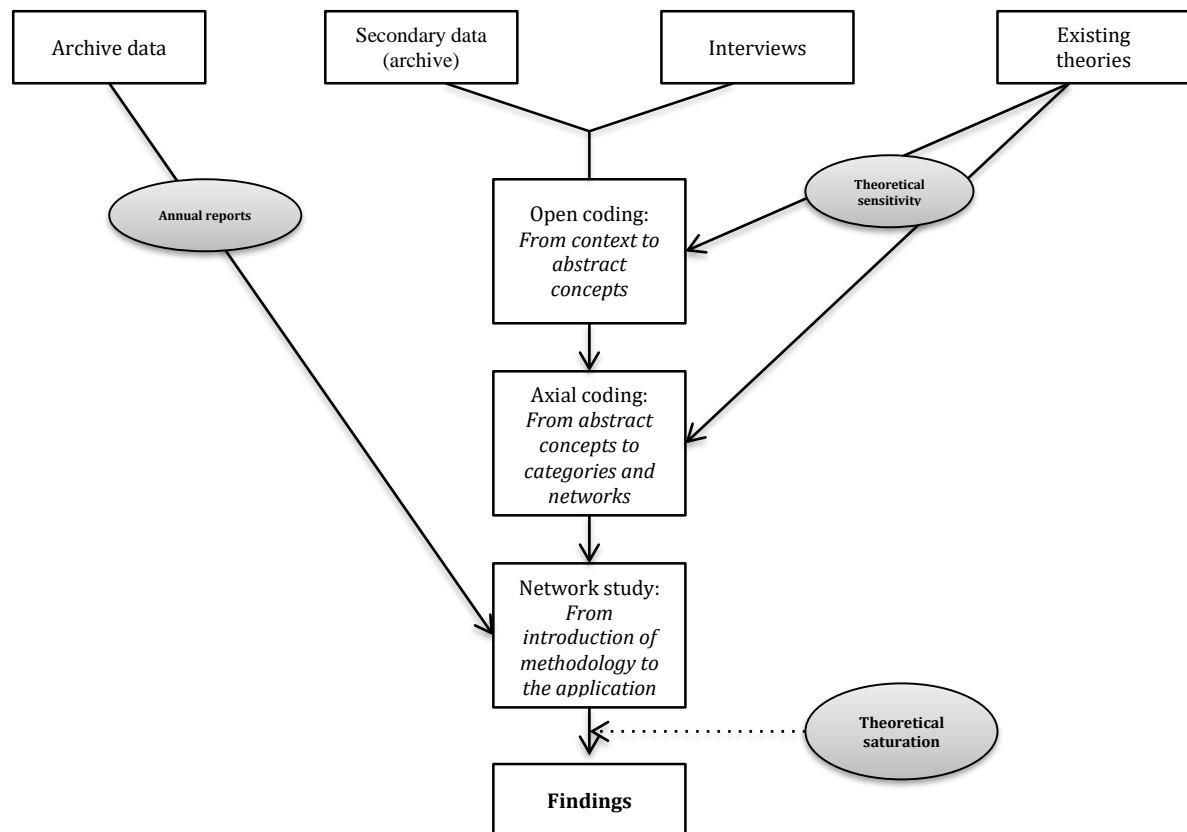


Figure 2: Data sources and analysis thereof (adapted from Nardelli, 2014)

Evaluation of results

Ultimately, I present a reflection of my empirical results considering *generalizability* and *validity* in order to evaluate the overall approach in this Ph.D. thesis. In this regard, I present definitions of validity and generalizability, and evaluate my results in light of them. In addition, I put particular emphasis on the reflection of results against different paradigms integrated into the dissertation across individual research papers.

Generalizability of results

General understanding of the concept of generalizability refers to *an act of reasoning that involves drawing broad conclusions from particular instances - that is making an inference about the unobserved based on the observed* (Polit & Beck, 2010). Although, different approaches seem to be feasible to approach generalizability of results, I use Polit and Beck's (2010) definition.

Polit and Beck (2010) defined three separate models of generalizations derived from Firestone (1993):

1. Analytic generalization;
2. Statistical generalization;
3. Transferability.

Given that the present dissertation accounted for two separate methodologies, the two types of approaches reflect two types of generalizability: *analytical* and *statistical* generalizations. Yin (2014) argued that analytical generalization approach is applicable to qualitative research rather than quantitative, as the research process primarily undergoes an *abstraction of results from the empirical material to a general level*. This type of generalizability is primarily associated with the exploratory part of this dissertation, as the process of data collection and the analysis primarily went through theoretical sampling of participants and a combination of open and axial coding during the process of abstraction (Eisenhardt, 1989; Glaser & Strauss, 1967). In particular, I carefully selected an empirical sample of participants on the basis of the emerging theories rather than on the statistical evidence, and combining the principles of grounded theory with Eisenhardt (1989) I aimed at providing generalizability of my results. The extraction and presentation of the results is conducted in the manner that theoretical background, empirical data together with the methodological approach could be applied and/or replicated within and across the empirical contexts by other researchers (Corbin & Strauss, 1990; Eisenhardt, 1989). Those guidelines have been accepted as providing generalizability from empirical insights to theory.

On the other hand, statistical generalization is more applicable for quantitative studies. This definition corresponds to what Lincoln and Guba (1985) referred to as nomothetic generalizability in relations with the quantitative research, or *statistical generalization* in qualitative studies (Yin, 2014). The broader meaning is the "*identification of the population to which researches wish to generalize results*" (Polit & Beck, 2010). They suggest that representativeness of the results based on a selected sample would be best achieved by applying the random (probability) strategy, which gives each population member an equal chance of being selected. However, taking into account that "*random samples seldom result in random sample*" (Polit & Beck, 2010), and that representativeness of a sampled population of social actors could be questioned in regards to the network studies when *completeness* (Robins, 2015) is fundamental, I selected the entire population to inspect the focal phenomena.

Finally, following the suggestions by Webster and Watson (2002) it might be fruitful for the research to be frequently reviewed and commented by colleagues, as it enables achieving maturity and enhancing the quality of the work. Therefore, I presented paper 1 at the workshop of Design Ethnography in Information Systems (Mini-IRIS) 2015, before I undertook final revision and submission to the journal.

Validity and reliability of results

Considering that this dissertation is grounded on a complex methodological approach as it occupies two aspects of theory building, I utilized a multiple validity strategy. A broad definition of validity, in fact, refers to whether the intended object of a measurement is actually measured (Yin, 2014). Despite the qualitative study not incorporating the actual measurements of variables, for these studies quality is the most important, which reflects on how well the data fits the study (Stenbacka, 2001). Since the qualitative research approach has a main concern with the high risk of bias (Johnson, 1997), to increase validity of the overall study I started with explorative research. As a preliminary step in my research process, it enabled me to gather, at first, a broader understanding of the context and initial phenomena of primary interest by asking broader questions. This enabled me to narrow down the scope of further research stages, which is reflected in the heterogeneity of research papers included in this dissertation. Such an approach, and the novelty within the field has led me to enter the empirical context with an open mind and by asking general questions, which freed me from any potential pre-conceptions that might lead to biases. However, my initial intention at the beginning of this project was to investigate the role of ICT in auditing and its implications on social actors. But, relations and social networks emerged from the open exploratory approach as more relevant and rather focal issue that was relevant for both practitioners and theory, and was an under-researched area in the studies of auditing.

Firstly, I applied *interpretative validity* approach to strengthen the validity of the exploratory study as the formal approach, which implies an accurate interpretation of the meanings of respondents' statements (Johnson, 1997). In addition to that, I temporarily interacted between data and theory in order to examine how preliminary findings and newly collected data correspond with the existing theories (Dubois & Gadde, 2002).

Secondly, I employed *peer review* as an additional strategy to assess validity of my results. This strategy of independent review was provided by academic researchers or those

familiar with the research phenomenon being explored. Peer review is considered to improve the quality of the research, but it is also a subject of critique. The peer review of my articles has been provided by an external check (Creswell, 2009, p. 208) of the research process that I have conducted for this dissertation.

Finally, main concerns on reliability could be distinguished according to the type of the empirical data used across the overall study, and are twofold. On the one hand, for the qualitative data I developed interview protocols and the database to increase reliability (Eisenhardt, 1989; Yin, 2014). In this regard, all respondents that were involved are, or were, professionals within the assurance service of their respective audit firms from the Big 4 network. On the other hand, for the quantitative data I paid particular attention to strict delimitation of the network extent and analytical techniques for processing the large amount of data. Following the specific conditions under which the network is delineated would enable other researchers to replicate the analysis and reach the same empirical results. Lastly, the utilization of computerized analytical techniques enabled me to process the large amount of data and concurrently diminish the likelihood of committing quantitative mistakes, which would, in the end, affect the reliability of findings.

Findings and contribution

In this section, I provide a summative outlook of the overall projects' conclusion. First, I present results from each individual paper, which I further use to outline the main conclusion by summarizing previous results. Secondly, I outline the contribution and implication of findings for both theory and practice. Finally, I provide concluding remarks, limitations and agenda for future research.

Summary of findings

In the introduction of this synopsis, I stressed the theoretical relevance for the investigation of relations among social actors within the assurance service context. Throughout the Ph.D. project, I have conducted an extensive literature review and carried out several data collection and analysis cycles within the auditing service field to gain a better understanding of the research problem. To achieve the aim of the investigation, a combination of perspectives and approaches have been integrated into the project and employed in individual studies. The principal aim was to investigate how interactions between auditors unfold, and how and what particular attributes determine the emergence of relations among social actors regarding audit engagement. To discuss the principal aim across the research context, I selected several specific aspects that included interactions, relations and networks in order to achieve the overall goal of the project. Such aspects included: (1) the impact of ICT on the unfolding of communication and interaction between audit team members across different levels (ranks); (2) the auditor affiliation network driven by collaborative relations between audit partners; and (3) the impact of interlocking directorships on auditor selection investigated through the influence of reputation on multiple social selection processes.

Overall, this dissertation emphasizes the importance of observing and understanding implications of social actors' attributes and interdependences of existing and non-existing relations on network emergence and structure, and outlines approaches and methods through which the emergence of relations should be investigated in the accounting and auditing context. Furthermore, and more interestingly, this work underlined that characteristics of social actors reflected in their personal attributes play an important role in the emergence of relations, apart from principal exchange of benefits as drivers of relation emergence. This work delineates the existence of a homophily effect, as a main driver of social relations in networks of auditors.

Findings from three separate research papers show the following. The use of ICT tends to create a trajectory of interrupted and enhanced unfolding interactions within and across

different audit ranks. However, a clash of trusts in either technology or auditors as carriers of profession across team members seems to be a main driver of tension that interrupts the unfolding interactions (Kacanski, 2016). The capacity of SNA and ERGMs as methodological tools could enable researchers to approach and understand complex network structures and interdependences between relations unlike other methodological tools. Homophily effect based on auditors' affiliations tends to condition auditor-to-auditor collaboration if their affiliation changes over time, which in other words means that a previous homophily effect might condition the current collaborative relation (Kacanski & Lusher, 2016). Interlocking directorships play a significant role on auditor selection process, where reputation, as a demand mechanism, has a significant impact on both interlocking directorships emergence and auditor selection processes. Although significant, reputation has a non-coincident impact on both observed selection processes (Kacanski, in press).

Paper 1: ICT in auditing: Impact of audit quality norms on interpersonal interactions

Paper 1 investigated the impact of ICT on interaction between audit (engagement) team members, within and across different ranks. It explored how technology, as a condition of auditors' working environment, prevents and/or enables the unfolding interaction between auditors within and across different ranks (as defined in research objective 1).

Paper 1 asserted that both constraining and enabling capacities of ICT differently affect audit team members and their perceptions on technological capacities for audit quality. Arguably, that is a consequence of an unequal level of team members' exposure to ICT, which creates distinctive certainties in human and technological carriers of audit profession across different ranks, and also because of different professional motives they hold that could either be subjective or objective. This article distinguished practitioners' perceptions of the impact of technologies in their own work, which arguably creates a condition under which the necessity and importance of unfolding interpersonal interaction and communication emerges as a consequence of their motives.

This study discussed practitioners' reflections on both constraining and enabling capacities of technology in relation to their professional incentives, and the consequences of disparities of their perceptions on interpersonal interactions and communications. It did not take ICT as the unit of analysis. Rather, it took the risk-based audit methodology, as an ICT

integrated audit tool that organizes audit engagement. The methodology allows for organizing and structuring the audit team's engagement tasks, which is further used to inspect differences between arguments related to the impact of technology on auditors' perceptions. Thus, units of the analysis were practitioners' opinions, perceptions and reflections related to ICT as a professional environment, which was formed as a consequence of embedded audit methodology into ICT which auditors use.

To explore how ICT affect the unfolding of interaction and communication between audit team members, practitioners' perceptions and opinions were analyzed. In order to collect the data for the analysis, I conducted semi-structured and in-depth interviews with auditors employed at the Danish subsidiaries of Big 4 audit firms. The analysis of interviews was based on the grounded theory approach (Corbin & Strauss, 1990), which was used as an analytical tool. In particular, this entailed the use of two coding stages (open and axial) in order to, at first, analytically break down the collected data and develop concepts and categories, and second, to develop the network of concepts to facilitate interpretation of results.

Based on the analysis of auditors' perceptions about the use of technologies in audit engagements, results indicated that practitioners approve the implementation and use of ICT. Approvals across ranks were a result of similar stances in regards to the capacity of technology to contribute to productivity and efficiency of their work. Such a "*present time*" practitioners' perspectives indicated perception of current impacts of ICT on audit engagement, generally, were uniform. This implied that auditors across different ranks perceived that technology contributes to the efficiency of technical aspects of the overall work of audit teams. However, previous uniform perceptions turned into opposition across audit ranks, as practitioners perceived that technology tends to, partially, negatively contribute to their professional development as it limited their actions and expression of their professional knowledge. This was a result of the constraining capacity of technology, which particularly limited lower-ranked auditors to actively participate in developing and altering methodologically (ICT) determined audit tasks, while highly ranked auditors did not have the same perception. This was a result of an unequal exposure to the use of technology during particular engagement.

The results of the analysis further indicated that such opposite perceptions seem to be the consequence of different levels of trust that auditors in different ranks have in human or ICT, as carriers of profession. In particular, highly ranked auditors (superiors) seemed more trusting of technology than the lower-ranked (subordinate) auditors, as the controlling capacity of technology prevented subordinates from altering audit procedures, and intentional or

unintentional mistakes. On the contrary, subordinate auditors seemed to be bound by technology when developing their professional profiles due to the mundane nature of tasks they perform, while they perceived that the list of tasks should not be strictly prescribed by ICT. These oppositions were the result of discrepancies in trust of different carriers of the profession, superiors over subordinates, and subordinates over themselves. This was further replicated in the level of comfort that audit practitioners perceive over those that represent the other ranks enrolled within the same engagement team, and their work. Superior auditors seemed comfortable with subordinates' performances since technology facilitated their work in terms of structure and scope, and in such a way increased their efficiency by speeding up the outputs, which would otherwise require more time. In contrast, subordinates, due to intruded procedures, might not experience comfort in their outputs since they did not participate in the development of audit procedures. These findings indicated that the auditing process, which Pentland (1993) defined as gradual ritual chains based on transfer of comfort, seemed to be an unsustainable auditing model because the transfer of comfort from subordinates to superiors tended not to be experienced by the former group. However, it was compensated by superiors' trust in the capacity of technology to control and sustain the expected quality of audit reports, and therefore, creates a condition under which the unfolding of interaction across audit ranks seems not longer to be the necessity.

Paper 2: The application of SNA to studies on accounting and auditing

Besides viewing the unfolding interactions between auditors as a result of trust discrepancies in different carriers of profession, and in order to understand interactions by exploring their structures, this paper explored the capacity and appropriation of SNA methodology to studies on accounting and auditing. First, it strived to introduce SNA methodology and inform the research field of accounting and auditing about the capacity of ERGMs for inspecting relations between social actors. Second, the empirical part investigated the structure of relations between audit partners. This paper is relevant because it aims at informing researchers, particularly in the field of accounting and auditing, on how SNA and ERGMs as network methodologies could be utilized as a tool to explore mechanisms that drive network emergence. Also, it explored auditors' affiliations to inspect the significance of attractiveness for collaborative relationships, and as possible knowledge and experience dissemination.

This paper assumed that understanding, observing and exploring relations in accounting and auditing is important. This is because understanding social actors' characteristics might

have an impact on determining the emergence of relations between two social actors, which may not be adequately understood without utilization of the adequate quantitative-based methodological tool. The use of quantitative tools enable mutual inspection of propensity of tie emergence in relation with multiple theoretically chosen drivers, which enables concurrent examination of different attributes and determining the most prevalent that condition the establishment of the relation.

The objective of this paper was to contribute to the studies of accounting and auditing by, firstly, informing researchers on the capacity of an additional methodological tool, and to enable the inspection of interdependencies between relations besides inspecting the attributes as a central driver to tie emergence. SNA enables approaching relations and inspecting their meanings by taking into account the condition of interdependence. However, the aim of the introductory part is not to criticize or derogate other approaches, but rather to emphasize capacities and relevance of incorporating a still neglected research methodology within the research field. The use of this methodology might enable researchers to investigate organizational aspects of social interactions within different settings and explore diverse questions. In this regard, the first part of the article introduced theoretical concepts that could be applied to discuss empirical findings in accounting and auditing, while also delineating resources of relational data and software that are available for network analysis, which is completed by a description of ERGMs, as the cutting edge statistical model in SNA. To stress the necessity of exploring and understanding relations and networks as immaterial formations existing between social actors, those methodological tools might enable switching the perspective from social actors to immaterial forms established between social actors, and their impact on other immaterial aspects of the social world.

Findings from the empirical part suggest that collaborative relational structures between audit partners tend to be structured between those of the same affiliation, which, if changed over time, tend to become adapted and replicated to the new affiliation. However, adaptation to the new environment results in auditors' tendencies to gravitate towards those that hold the same affiliation. Also, auditors that changed their affiliation over time tend to be attractive to audit partners, which could be due to their previous experience and knowledge acquired in a different work environment. Therefore, findings here suggest that auditors that occupy structural holes (Burt, 1992) position in the network of audit partners are attractive to other auditors as those might provide new and fresh empirical knowledge, which, as could be expected, might contribute to the quality of audit opinion and learning potentials for auditors.

Paper 3: The reputation driven interplay of relationships between clients and auditors in an auditor selection process: A multilevel network approach

As the ultimate part of the thesis, interdependence between relations among companies and their relations with auditors were analyzed. This case study explored how the existence of relations between companies, observed through the interlocking directorships, influence the emergence of companies' relations with their auditors. A key issue in this interaction was whether and how interlocks might determine the selection of reputable auditors and under what conditions such a scenario occurs. In this respect it was necessary to understand how reputation as a social selection mechanism drives the tie emergence between both the same and different social actors and under what conditions that emerges. Therefore, the purpose of this paper was to investigate the structure and evolvement of social network between auditors and clients in the process of auditor selection.

To categorize the existing body of knowledge on the investigated issue, I identified and selected two groups of literature that had an important impact in the study: (1) auditor selection process - factors, reasons and drivers that trigger clients' selection and/or change of the existing auditors (Francis & Wilson, 1988; Magri & Baldacchino, 2004); and (2) interlock directorship emergence - focusing on rationales behind incentives of establishing the proximity between companies through shared non-executive supervisory board members (Galaskiewicz, Wasserman, Rauschenback, Bielefeld, & Mullaney, 1985; Gu & Lu, 2014; Parkhe, 1993). Specifically, the aim of this study was to mutually challenge the two streams of literature that both argued that incentives for establishing interlocks and auditor selection and change are no longer driven by financial (profits, audit fees), and behavioral (availability, treatment, communication) reasons, as was previously argued, but instead reputation.

This study utilized previously introduced and elaborated ERGMs to explore relations and network configurations. Different from other studies on relations in auditing, this paper not only used the innovative statistical method to explore network of relations regarding the social selection processes, but opened up an alternative research perspective for studies on accounting and auditing, as it focused on relations and networks as the unit of the analysis. Thus, the research has displaced the focus from the effects of relations on increase or decrease of the reputation level, but observed how relations as such are interdependent upon one another, within the complex structure of social relations observed in the particular context.

The results indicated that reputation as an intangible asset has a significant impact on both social selection processes over material variables, such as net profit and company size. First of all, reputation drives interlock emergence, and second, it influences companies' selection of auditor. The network structural parameters revealed that companies tend to form complex closure-like network configuration between reputable companies. Closures imply that two companies sharing board member tend to form interlocks with the same companies, particularly with those holding the same reputation level. In other words, this means that intersecting board members play a role in selection of other companies to which both companies will interlock. That selection is also driven by the same attribute effect that has brought the preliminary interlock to emergence.

Interestingly, reputation does not drive both processes simultaneously. Results revealed that reputation is compensatory, and affects one selection process only when the other is deteriorated by changed reputation level with whom the relation already exists. Results showed that deterioration of the reputation-based homophily effect in the closure-like network configurations, companies tend to engage into an alternative reputation regaining mechanism that is sourced at the auditor selection level of the network. Reputation-based social selection process is measured with the existence of the homophily effect, which refers to the likelihood of relational tie emergence between those that share the same reputation level. Although reputation represents a significant driver to both selection strategies, it never simultaneously had a significant effect at both network levels across the same model. Therefore, auditor selection process seems to be based on auditors' reputation, but only when clients perceive that the same reputation level no longer holds the interlock, so companies tend to seek the alternative reputation source, which are auditors.

Limitations and implications for future research

Limitations

While this dissertation is not free of limitations, it provides a solid basis for outlining an agenda for future research. The results will hopefully catalyze future ideas and provide a foundation to promote future debates.

First, the exploratory part of the research was based on a qualitative analysis of interviews where two main limitations were the sampling methods and size of the sample. Despite the employed research method enabling investigation of the problem in depth, it also generated the question of generalizability of results. Additionally, the first part of the work was based on a relatively small sample of research participants. The selection of participants via snowball and convenience sampling techniques is, to a large extent, criticized for generalizability (Miles & Huberman, 1994; Nardelli, 2014; Yin, 2014). The sample may not be considered as representative as it is prone to bias. To reduce the risk of bias and overcome such problems, I complemented interview data with archive data. Also, I discussed results of the analysis with practitioners and researchers in order to achieve a higher level of confidence in the generalizability of results. However, by utilizing those supporting procedures, I managed to strengthen the confidence in generalizability to, at least those other work-intensive services whose practitioners were subject to the technologization of audit procedures. Speaking of relations, this paper did not inspect the structure of relations unfolding between auditors. It rather aimed at understanding practitioners' reflections on the utilization of technologies regarding the unfolding interactions between team members as a consequence of the use of ICT on perceived successful audit engagement and good audit quality.

Second, papers 2 and 3 were based on the same empirical data, which might entail biases regarding the data pool. Despite those two papers being based on the same research and analytical methods, data collection for both papers was not based on interviews, where respondent's answers could be interrelated and biased across different studies, and therefore, less specified to the research question. In this regard, since both studies were quantitative, the same data source causes a lower level of biases for the results, since the data overlapped only to a particular extent. Also, the archival documents that sourced the data did not imply the actual use of the same information across both studies, but they reflected different aspects and perspectives of relations that were observed in the studies, so the validity of results has not been compromised. However, the case was limited to the extent that it did not examine the impact and prevalence of affiliation homophily effect over other auditors' attributes. It rather aimed at

testing the presence of the effect of homophily in a multiyear approach, thus, findings contribute to the overall argument as they confirm that the observed effect exists and it impacts the structuring principle of the network. Lastly, paper 3 did not observe regaining reputation as a result of cooptation strategies, but rather tendencies that actors occupy in the social selection processes.

Third, the terms relations and networks, as central concepts in this study, despite being considered 'buzz-terms', were not regarded as concepts whose subjective interpretation by respondents might either be the object of misinterpretation or require additional elaboration, because both studies, where the terms were introduced, were based on quantitative methodologies. Therefore, the question of coherence of understanding terms was not problematized as their meanings were directly related to their theoretical conceptualization, rather than being the subject of respondents' interpretations, which was avoided due to the analytical method used. Thus, the bias for potential misconception was methodologically avoided, as it was the subject of the research question and design reflected through the theoretical underpinnings of the study.

Implications for future research

More research on technologically impacted interaction is needed. Omoteso (2012) emphasized seven areas in which the adoption of artificial intelligence will have an unrestrainable influence in auditing: (1) design of internal controls, (2) monitoring the audit committee's effectiveness, (3) small and medium audit firms, (4) education of auditors, (5) public sector organizations' audit, (6) auditor independence, (7) and expectation and performance gap. Moreover, my personal suggestions is that future research should explore an additional direction. This thesis opened up discussion related to the question of interaction from an angle of unfolding communication; I suggest that we need to emphasize even more the importance of the question of the unfolding and development of inter-subjective interactions during the audit engagement, in both the overall process and in relation to particular tasks or the employed audit tool used by the audit team members. It would also be beneficial to understand how the multifaceted aspects of information flow and knowledge sharing among practitioners unfold through the process, and how a homophily (resemblance) among practitioners constrains the social selection process of knowledge sharing across different ranks from the perspective of cognitive networks (e.g., Brennecke & Rank, 2016), and what different impacts the audit tools might have on auditors' professionalism, and on the audit profession as the whole. Those studies would be beneficial, as

they could deeply inspect likelihoods and tendencies towards particular network structures and strengthen further generalizability of findings.

Furthermore, as the research touched upon several aspects of interactions, relations and networks from the cross-sectional dimension, it lacks clarity regarding the process perspectives of social network evolvement. For instance, additional investigation of network dynamics would enable a broader and deeper outlook of how and why observed network parameters interrelate across already inspected or other cross-sectional models. Future research should address those issues that are partially methodological and partially theoretical, which would complement the cross-sectional perspective of observing the issue of relational interdependences.

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PART II:

ORIGINAL RESEARCH PAPERS

Paper 1: Kacanski, S. (2016). ICT in Auditing: Impact of Audit Quality Norms on Interpersonal Interactions. *European Financial and Accounting Journal*. Vol. 11. No. 4. pp. 59-84

Paper 2: Kacanski, S., Lusher, D. (2016a). The Application of the Social Network Analysis to Studies of Accounting and Auditing. *To be submitted to Journal of Accounting, Auditing and Finance*.

Paper 3: Kacanski, S. (2016b). The Reputation Driven Interplay of Relationships between Clients and Auditors in an Auditor Selection Process: A Multilevel Network Approach. *Accepted at Journal of Accounting and Management Information Systems*.

PAPER 1

Kacanski, S. (2016). ICT in Auditing: Impact of Audit Quality Norms on Interpersonal Interactions. *European Financial and Accounting Journal*. Vol. 11. No. 4. pp. 59-84

ICT in Auditing: Impact of Audit Quality Norms on Interpersonal Interactions

*Slobodan Kacanski**

Abstract:

Productivity incentives have lately been driving auditors to introduce and utilize various computer-based tools to assist their work. The aim of this study is to understand how and why productivity incentives may disturb interpersonal interaction and relations between auditors at different ranks, in the context of assurance service. A case study was carried out with auditors affiliated with Danish subsidiaries of Big 4 audit firms to inspect the implementation and utilization of global audit methodology (GAM), which is the ICT-based platform that guides subordinate auditors through the audit process. The results highlight that superior auditors tend to experience prevalent trust in ICT tool over subordinate auditors, where such conditions reduce the opportunity for experiencing comfort by subordinates, while superiors still perceive comfort due to being comfortable with procedures that are administered by the tool. Finally, this mechanism further creates conditions under which the necessity for establishing interactions and relations between auditors of different ranks become diminished.

Key words: Global audit methodology; Information and communication technologies; Audit quality; Interactions.

JEL classification: M42.

1 Introduction

A continuously intertwining tension between cuts of audit fees, incentives to increase productivity, efficiency, and effectiveness and ensuring good quality of audit reports, characterizes the today's world of the assurance service. In order to mitigate possible negative consequences of financial pressures due to higher audit fees but to retain institutional legitimacy, audit firms tend to advance auditing methodology by integrating information and communication technologies (ICT) (Manson, McCartney, & Sherer, 2001). However, the omnipresence of the ICT in audit firms and utilization of computer-assisted audit tools and techniques (CAATs) has generated a broad range of consequences on the carriers of a profession as well to the profession as such.

Over the past decades, two research streams were segregated in connection with roles and impacts that ICT brought to audit profession and auditors as carriers of the profession. On the one hand, literature indicated that audit firms tend to turn to the ICT in order to increase work efficiency and quality of the audit reports, which they use as a tool to yield bigger profits while shortening the engagement time and servicing more clients in a unit of time (Abdolmohammadi & Usoff, 2001; Banker, Chang, & Kao, 2002; Janvrin, Bierstaker, & Lowe, 2008, Elliot, Kielich, & Marwick, 1985). Additionally, literature shows that socially designed technology (Berg, 1998) provides a wide range of audit tools that may support almost any audit task that span from data extraction to data analysis (Pedrosa & Costa, 2012), which contributes to productivity and disburdening auditors, but also reducing the level of auditors' responsibilities.

The second group of studies revealed that utilization of auditing tools during audit engagement might moderate the structure and sequence of auditing procedures. Thus, ICT-based audit tools have potential to facilitate auditors' thoughts (Pieptea & Anderson, 1987) through which the ICT generates

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a list of tasks that keeps auditor's focus to those that are estimated to be essential for a particular engagement (M. Abdolmohammadi & Usoff, 2001). Glover, Prawitt & Spilker (1997) argued that ICT relaxes the need for professional assistance for newcomers as tools enable relatively inexperienced auditors to approach tasks mechanistically. However, besides the simplification, literature stressed that technology may affect auditor's judgment and impact the quality of final reasoning (Bonner, 1999; Bell et al., 2002) as auditor's judgment may be moderated by technologically predetermined procedures, which consequently may constrain appearance of multiple opinions (O'Leary & Watkins, 1989) and discourage professional discussions. All these have raised an additional concern about the consequences that utilization of ICT in auditing had on generating professional judgment since profit incentives, efficiency and effectiveness gains, and cost reductions, notably affected auditors' judgmental and decision-making skills (Adler, 1987). In the overall, literature emphasized that integration of the ICT-based audit tools both enhances auditor's performance by increasing productivity and efficiency of their work, but also may propel the issue of deskilling professionals, as according to Swinney (1999) auditors that use ICT tend to over-rely on technologically generated output. However, a comparative study by Brazel, Agoglia & Hatfield (2004) showed that even though ICT increases efficiency, auditors that manually conducted audit engagement tend to feel more accountable to their correspondents in relation with delivered opinion, which proves that judgment is merely a cognitive process, and may create the feeling of importance. This extends Pentland's (1993) argument that auditor judgment, besides of cognitive, is also a result of an emotional resource when a feeling of comfort gives an additional input to the auditor while constructing the opinion. This implies that professional judgment is comprised of both cognitive and emotional parts, which both are personal. In relation to this, I assert that due to technology, the possibility of experiencing comfort becomes significantly diminished as technologies and audit tools are becoming more reliable carriers of the audit profession.

Despite that previous research provided with some of the critical reflections on the utilization of ICT in auditing on various aspects, the literature has not yet observed how the use of technologies influenced differently ranked auditors. Also, studies neglected to inspect whether and how perceptions about ICT differ across various audit levels. To overcome the limitations of previous studies I introduce an alternative theoretical background to serve as a tool that has the capacity to challenge previous two streams of literature through the case study that will enable putting incentives for productivity and comfort-related deskilling effects into the foundation of current tensions that are observable in the audit profession. Therefore, study here concentrates on how mechanisms of trust in carriers of the profession, ICT, and humans, mutually challenge one another. According to this, I argue that superiors and subordinates are expected to have dissimilar perceptions of implications of the ICT that could, in auditing context, be ascribed to comfort, which might consequently impact the social interaction between auditors belonging to different professional ranks.

In particular, this study focuses on how both subordinated audit staff, which the make use of technology, and superiors that hold productivity incentives, but do not utilize it, individually perceive (1) the ICT in regards the advantages and disadvantages of their implementation on themselves, and (2) the other audit ranks through the functional properties of the ICT. To put ICT adequately into the research context, I introduce the case of risk-based audit methodology, named *global audit methodology* (GAM) that has recently been implemented among audit firms at the global level. Integration of GAM into the ICT aims at ensuring a consistent approach to all audit engagements, which provides auditors with guidance through the auditing process. This article has been inspired by Sorensen & Sorensen (1974) study on conflicts in bureaucratic organizations that were caused by differences in a rank-based professional aims. For the purpose of this study I distinguish two groups of professional ranks: (1) superiors (audit managers and partners) and (2) subordinates (interns, junior and senior auditors) from the Danish context of Big 4 audit firms. Through the qualitative, cross-sectional investigation, this study exposes the unfolding of sources of a focal entity to answer the following research question:

How and why does the implementation of GAM into ICT impact the relationship between superiors and subordinates in Danish auditing context?

Finally, previous literature has primarily emphasized empirical implications of information technologies from the holistic organizational perspective irrespective to the theory used (Bierstaker,

Burnaby, & Thibodeau, 2001; Brazel et al., 2004; Dowling & Leech, 2007; Dowling, 2009; Manson et al., 2001; Omoteso, Patel, & Scott, 2010), whose limitations tend to be overcome in this paper. Studies have discussed particular implications and consequences of ICT regardless of potential divergences that might be apparent at different professional ranks.

In this study, the unit of analysis are events, happenings, and incidents (Charmaz, 2006; Corbin & Strauss, 1990; Glaser & Strauss, 1967). They are isolated from each participant in order to be studied, which are afterward coupled into two chunks based on participant's affiliation to the particular audit rank in order to extract theoretically grounded coincidences that are ultimately mutually challenged for identification of structural incompliance.

The article proceeds as follows. The introduction presents the background and the research question of the study. The second section outlines theoretical background including the main concepts of the research. The third section delineates the main methodology behind the study, including an elaboration of the empirical context. This is followed by the analysis of the findings. The final section provides a discussion of the results, concluding remarks and limitations of the research.

2 Theoretical background

This section proposes theoretical standpoint of the study by concentrating on Giddens (1990) conceptualization of modern social order that will further serve as a tool for understanding tensions at the focal social context. Giddens (1990) propounded a theory of institutional analysis of *modernity* associating the concept of modernity with time period and location of a current. The concept of modernity refers to modes of social life that are no longer driven by manufacturing system since current institutional transformations have moved the system towards the one centrally concerned with information. That information-based system implies that information organize the social order as they moderate interactions between social actors.

Marx and Durkheim preceded development of theory of modernity where both saw modern era as troubled, but believed that benefits would outweigh its negative characteristics. But Giddens' (1990) theory had substantially different point of origin located in a term of *discontinuity*. The term was unrelated to historical materialism - as a transition from one form of social system to another, but included the following features: pace of change, scope of change and intrinsic nature of modern institutions. For Giddens, modernity is multidimensional on the level of institution.

Society (and sociology) is an important but ambiguous concept that carries the central notion of 'boundedness' of a social system that has an objective to solve the problem of social order. According to Giddens, the problem of social order in modern societies directs attention on how social system "bind" time and space. He sees the social order through "*distanciation*" of space and time, which is a condition based on which these two connect presence and absence, so it is essential to understand how modern institutions are situated in the particular space and time. A term of institution here refers to inter-subjective interactions, form and nature of that relation. The notion of distanciation enabled him to argue that every social interaction at the very encounter has its ordinance in distance. This implies that any present social interaction, in a variety of social contexts, is distantly molded through its institutionalized form, i.e. no encounter is organized at the spot of occurrence but its nature is already specified somewhere before. Therefore, materialization of social interactions occurs only at the encounter, but the character of it is both enabled and directed outside of that encounter through different forms of standardization. Unlike the traditional approach, in this way conceptualized modernity has capacity to connect local and global up to previously traditionally unthinkable perspectives. The core of this theory of modernity is in two interconnected mechanisms that hold distinctive properties and which could be identified in any context that involves social interaction. Put forward by Antony Giddens (1990) the theory of modernity conjectures the existence of two mechanisms that drive almost any social interaction: disembedding and reembedding.

Firstly, *disembedding* is a mechanism that "lifts out" the locality of social relation and restructures it across an indefinite span of time and space (Giddens, 1990, p. 21). Therefore, social practices are removed from immediacies of context, and their localized experience becomes shaped through impersonal and abstract processes that occur on the other side of the world (Stones, 2012). When interactions do not take place, disembedding mechanisms would not reify but they will still exist,

however, only in their abstract forms. An objective of these mechanisms is to explicate a power of modern institutions to shape the nature of interactions at the global extent and secure social order.

Disembedding is a necessary condition (Stones, 2012) for spreading two impersonal and abstract mechanisms central to dynamics of modernity, namely: (a) symbolic tokens, and (b) expert systems (Giddens, 1990, p. 22). Both of these mechanisms take a role in coordinating social interactions between distant and the absent others.

Symbolic tokens are *media of interchange* based on which social interactions are regulated. They are spread around in a form of regulations, which apply only to those social actors that materialize particular form of interaction at a particular time. Symbolic tokens have a function to standardize expectations and possible outcomes of social interactions and prohibit unethical actions. On the other hand, expert systems are systems of professional expertise and technical accomplishments that enable purposeful social interaction to occur, such as establishing relations with lawyers, architects etc. (Giddens, 1990, pp. 24–7). Thus, expert systems are capacitated to organize large areas of material and social environment where social interactions occur. Coupled together, both symbolic token and expert system assemble the abstract system.

Abstract systems require trust in both of its constitutive elements. In particular, trust in a symbolic token is shared and grounded on the abstract capacities of what couples individuals at the encounter. It does not create trust in individuals as a "whole", but only to those "parts" of individuals that share the same values in the abstract mechanism during the interaction. But, expert systems are based on the faith in the professional expertise that is continuously developed. Giddens argues that the nature of the modern interaction is deeply bound with the trust in abstract systems, but particularly in the part of it related to the expert system (Giddens, 1990, p. 83).

Giddens (1990) couples the previous mechanism with one of reembedding. He argues that reembedding mechanism is a reappropriation or contextualization of previously distantly specified interaction to its already predetermined form. Therefore, reembedding mechanism (Giddens, 1990, p. 79) pins down all of the elements of the abstract system to the encounter where interaction between social actors becomes materialized, as it suggests the nature and the content of realization.

Reembedding mechanism distinguishes two commitments: facework and faceless. Facework commitment refers to a personalized trust that exists and becomes experienced by social actors when the encounter occurs. Faceless commitment refers to the concerns of development of faith in the abstract system. In order to achieve functional appropriation of disembedding and reembedding mechanisms, Giddens (1990) emphasizes the importance of trust in abstract systems. The level of trust enables social actors to estimate costs and benefits of a particular expert system, the selection and potential utilization of it.

This theoretical approach is selected as it enables observing of how trusts in different abstract systems, which are integrated into the same context, challenge social interactions. Concretely, these mechanisms enable analysis of relationships between superiors and subordinates whose interaction has been challenged by prevailing trust in an alternative abstract system that became reembedded in the contextual setting.

In particular, the moderating effect of the abstract system at the social encounter is the main mechanism that is in the focus of an empirical setting. The two-dimensional approach that integrates mutually interactive mechanisms is found to be conducive for a proper approach to the issues that try-outs of trust in a modern assembly of social interactions may have on human agency at the professional encounter. I believe that this analytical framework provides with an adequate approach to understanding how trust in distantly regulated procedures and technological accomplishments actually produce negotiation of trust in human carriers of the profession at the focal context of auditing, which ultimately influenced relations.

3 Methodology

Grounded theory and theory building from case study research

In this study, I adopted a grounded theory approach as it allows determining the sequence of necessary steps and tasks in the process of conceptualization and identification of relations between concepts in

newly established working environment of assurance services in international audit firms. Corbin and Strauss (1990) argued that qualitative methods could be systematically evaluated only if procedures and canons are made explicit. They have proposed canons of a 'good science' as a procedure that should be followed to help a researcher to develop a well-integrated set of concepts, which will provide the theoretical explanation of social phenomena under study. Since the literature on implementation and use of ICT in audit services have already recognized several core concepts that resulted from implications that technology made on auditing and auditors (Abdolmohammadi & Usoff, 2001; Banker et al., 2002; Bierstaker et al., 2001; Janvrin et al., 2008), the canons of grounded theory here aim at serving as a tool for extending and as well understanding relations between concepts.

To ensure a systematic approach to answering the research question, I draw on some research tools from grounded theory depicted by Corbin & Strauss (1990, 2008) and the case-study methodology by Eisenhardt (1989) to guide theory-building from case study research. First of all, a structured literature review was carried out in order to (1) set the grounds for the investigation; (2) identify objectives of the research, and (3) specify *a priori* construct (Eisenhardt 1989). I then selected the empirical context for the investigation, and entered the field for the data collection and analysis, as described in the following paragraphs.

The empirical context: Assurance services

An auditing service context of international audit firms, particularly Big 4, is in the focus of this study. Generally speaking, that service provides an independent inspection of annual and other financial accounts, and gives the assurance on whether those financial reports, that are objects of inspection, give a true and fair representation of a business entity.

A today's world of the assurance service is characterized by the omnipresence of information and communication technologies in work of auditors, because they have supporting nature and enable productivity and efficiency gains. Since ICT continuously develop and change, their permanent presence in research is crucial, particularly as they might affect a variety of other social phenomena. This particularly refers to the importance of conducting investigations of effects that technological advancement has on those that make the use of them (Orlikowski & Iacono, 2001), yet observed from particular empirical context. Assurance service is characteristic as teams that conduct particular audit engagement are assembled of members that belong to diverse professional ranks, from junior auditors to audit partners, where the number of those involved in single engagement depends on client's paperwork complexity. Since the extent to what auditors use ICT differs across the ranks, the implications that technologies have on their subjective perception of consequences that ICT have on their work, might be significantly different between them.

However, to tackle the research question, I selected the assurance service as a type of auditing and consulting services that Big 4 auditing firms provide. In order to bring theoretically extensive construct of ICT closer to empirical examination, I utilized global audit methodology (GAM) to scrutinize implications of ICT on auditors. Global audit methodology is a risk-based methodology (Robson et al., 2007) that has recently started to be used by international audit firms as a tool to enable delivering same proven approach and ensure quality to every audit engagement across their subsidiaries at the global level. The methodology is not only a standalone or a standard-like guide of predetermined procedures of engagement, but it is rather operationalized by cutting-edge technology as it is integrated within. Furthermore, the methodology is a cloud-based roadmap that is capacitated to organize the majority of auditor's work as it suggests steps, tests, and tasks that auditors should conduct to fulfill requirements of a single engagement. The methodology is composed of four groups of processes where each contains the list of tasks, which are related to single engagement: (1) planning and risk identification; (2) strategy and risk assessment; (3) execution; and (4) conclusion and reporting, which are compliant to ISA 315 "Identifying and assessing the risk of material misstatements through understanding the entity and its environment" (ISA 315, 2009). In order to adapt empirical interrogation of implications that ICT has on auditors, I put ICT in the function of GAM to a particular case of research.

As audit requires a specified list of tasks to be performed by members of the engagement team, which may range from the computer-based mundane, to person-to-person negotiations, an involvement of

auditors of diverse ranks is a prerequisite. Since diverse auditors might appear to have own perceptions and expectations about the ICT, they might appear to be similar within the same group, and different between heterogeneous groups, so the examination of implications across team members will open discussion on how different perceptions affect their interaction and relation.

Data collection and data analysis

I selected qualitative research methods as they adequately correspond to a perspective of emphasizing perceptions and expectations rather than variables, which are specific for alternative research methods. I collected cross-sectional data by combining interviews with archive data, as according to Langley et al. (2013) archive data may support interview data for tracing meanings of facts that were previously emphasized in discussions. For this study, I conducted qualitative interviews (Yin, 2011:133) particularly in-depth interviews (Weiss, 1994), which is qualitative research technique for conducting intensive and less structured interviews with a small number of participants about ideas, programs or situations (Boyce & Neale, 2006). In-depth interview technique enables collecting detailed data on changes that participants perceive in themselves that are the result of their involvement in a particular case, or if new issues are of main concern to researcher and they need to be explored in depth (Boyce & Neale, 2006). The interview data were supported by archive data that are collected primarily from interviewees, but also from secondary sources (Internet).

The sample of selected participants (Table 1) was taken from the population belonging to the Danish field of the assurance services of Big 4 audit firms to control for environmental variations and clarify the domain of findings to auditing (Eisenhardt, 1989; Eisenhardt & Graebner, 2007). Theoretical sampling was carried out in two subsequent phases. The first phase of interviewees sampling took place on convenience that was further followed by snowball sampling, which ensured overcoming of limitations that initial phases of data collection challenged (Eisenhardt, 1989). The study included in total 16 in-depth semi-structured interviews based on open-ended questions from five audit ranks from representatives of each Big 4 audit firm followed by archive documents to support the analysis and understanding the meaning of discussions.

Tab. 2: The sample of selected participants

Audit firm number	Audit rank	Number of interviewees	Interview number (ID)
1	Manager	1	1
	Senior	1	2
	Intern	2	3, 4
2	Partner	1	5
	Manager	1	6
	Senior	1	7
	Junior	1	8
3	Partner	1	9
	Senior	1	10
	Junior	2	11, 12
	Intern	1	13
4	Manager	1	14
	Senior	2	15, 16
Total		16	

Source: Authorial computation based on data collection

However, data collection and data analysis were not strictly separated phases, as the data analysis overlapped the data collection (Eisenhardt, 1989). Following the first canon by Corbin and Strauss (1990), I started the analysis as the first bit of data was collected. This approach enabled me to continuously adjust interview protocols prior the forthcoming interview as well during discussions on the basis of the emergence of interesting themes. To aid the data analysis I used NVivo software, v.10.1, to which I transferred the entire database, and implemented line-by-line open and axial coding.

4 Analysis of findings

The assurance service, where implementation of global audit methodology into information and communication technologies made consequences on working environment of Big 4 audit firms, are inspected in this study. In particular, this study observed how and why newly established auditing procedures influenced the interaction between auditors of different ranks. Particularly, the case concentrated on various aspects of auditors' perceptions of implications of procedural changes, observed from the Danish context of the assurance service. The set of employees under investigation included five respective audit ranks: (1) intern (student researcher); (2) junior (assistant); (3) senior; (4) manager (including senior manager and executive director), and (5) partner. Despite the fact that audit firms are occupying classification of professionals within seven respective ranks, due to differences in levels of professional responsibilities but relative similarities in relations with the individual audit engagements, I have grouped three managerial levels into the major cluster naming it *managers*. This categorization has enabled me to identify and understand reflections and differences in perspectives that particular professional rank has in relations to information and communication technologies (ICT), as well to inspect the origins of those similarities that apparent within the groups of participants. Also, I included interns (study researchers) into the study in order to observe their expectations from the professional engagements.

The analysis here delineates the most relevant findings from an examination of the focal case and gives the representation of results through three separate propositions that correspond to the theoretical background. The first proposition gives a general reflection on how auditing process has been affected by the integration of GAM in ICT (further referred as a *tool*), from interviewees' point of view. The second and third propositions provide extensive discussions about the tool since they capture participant's reflections on various aspects of consequences of utilization. However, analysis of findings captures reflections of each five auditing ranks, which due to homogeneity were coupled in two clusters and further distinguished as (1) superiors and (2) subordinates. Despite that different professional ranks carry significantly different level of responsibilities, the classification of ranks into clusters has been made according to the extent of their exposure to the ICT during audit engagements, against which subordinates are very dependent on technologies during the work comparing to superiors. The following table 2 provides with the outline of the structure of interviewees in regards to previous classification and auditors' affiliations.

Tab. 3: Overview of interviewees across audit firms and audit rank clusters

Audit firm	Superior	Subordinate	In total
1	1	3	4
2	2	2	4
3	2	3	5
4	1	2	3
In total	6	10	16

Source: Authorial computation based on data collection

The former cluster is assembled of audit partners and managers, while the latter was comprised of senior auditors, junior auditors, and interns. Such distinction was legitimate due to inequalities in levels of exposure to the ICT during the engagement, and such clustering enabled me to generalize differences between viewpoints of two groups of professionals.

Proposition 1: *Implementation of GAM in ICT increases productivity and ensures maintaining the quality of auditing.*

When managements of audit firms announced that new methodology would become an integral part of their future engagement procedures, and will change the nature of their work, they primarily argued that the rational for integration is in the fact that it will contribute to productivity and efficiency of the audit process. Despite that methodology has already existed for some years, and each audit firm has its own unique approach to engagement with clients, in general, the difference it made is that it became integrated into the information technology. Auditors here referred to the global audit methodology either as a tool or software since the methodology became an integral part of already utilized ICT system.

It is communicated that we need to be more efficient, have better software, which will allow us to work faster, smarter and make sure that everyone follows the methodology. (Interview with junior auditor, Audit Firm 2/Interview ID 8)

One of the junior auditors emphasized functional aspects of the tool. The interviewee stated that power of the tool it is in its capacity to control the engagement process as it provides with guidelines and determines steps that each team member should undergo, according to what they are in charge of. The tool aims at automating the sequence of tasks, as it contributes to the reduction of time spent on managing the audit engagement.

GAM is a kind of software that drives you through the procedures that you should do. It is a crucial part of each audit engagement because it is a kind of the roadmap of the entire audit process, with all phases. You just use your software and go step-by-step, and it automatically guides you through the steps and required tasks. GAM is developed just to be in line with that. (Interview with senior auditor, AF1/INT2)

A representative of subordinated audit staff depicts characteristics of the tool by outlining main sections of the interface. The tool organizes auditors' work by keeping the record of performed tasks and enables communication with other engagement team members directly through the system. However, GAM does not integrate tools for executing tests, but it rather organizes tools that are necessary to undergo the process.

It is one big checklist, and it guides you through the process and allows you to document all of your work. Besides the project, the software also incorporates communication. Then, you need to do additional work of verifying calculations, verifying documents, doing all of the analytical analysis on your own or maybe using some other tools. (Interview with intern, AF3/INT13)

At the preambles of the most of the interview discussions, interlocutors grouped to subordinate auditors pointed that GAM, from their general perspective, has a positive influence on productivity and efficiency of engagement. However, they also emphasize that this is the system that represents the core of their work, which shapes the character of a workplace of any subordinated auditor. It is apparent that subordinate auditors are highly reliable to functional capacities of the methodology, as it provides them with the access to instructions and enables easy overview to the current stage of the engagement process, as well the list of remaining tasks.

It is the main tool that we work with, so we use it all the time. It is very efficient and very basic tool, which makes us very productive. (Interview with partner, AF2/INT5)

It seems that general agreement on positive aspects of the tool exists both between superiors and subordinates. Namely, one representative of superior auditors, whose work is therefore not primarily ICT-based, emphasized that the main objective behind the utilization of the tool is the audit quality. They interpret quality as the adequacy of application of international standards on auditing (ISA) to the audit process. So the positive aspect of the tool is in its capacity to prevent subordinate auditors to either misinterpret or abandon particular regulatory requirement. As standards are subject to change, the methodology should be changed as well, but the switch to a newer version of standards requires less adaptation time by subordinate staff as updated methodology is instantly available upon integration, which minimizes the chance of committing a mistake.

The reason why we have this is that we want to make sure that we have the right quality, and it is important to us to have the right quality of audit... (They) change methodology every 3 - 4 years somehow, and this is because it is ISA compliant. (Interview with manager, AF4/INT14)

Proposition 2: *Superior auditors are more reliable to professional capacities of ICT and GAM than to subordinate staff.*

Superior auditors show high reliability in capacities of the tool as it aware them that utilization of it will ensure good audit quality. They perceive the tool as a framework that enables consistency with international standards on auditing during the audit process. As audit procedures need to be in compliance with ISA, and GAM is comprised of procedures that are ISA compliant, superiors stress the importance of following the tool in order to ensure fulfillment of all necessary regulatory requirements. They also emphasize that such a way of working is a brand new practice that should be accepted as the newly established working environment.

GAM is like a frame and it makes sense. We need to be within this frame, and we need to do these details to complete tasks or audit procedures. You get used to it. It is just a way of working. (Interview with manager, AF2/INT6)

Before audit firms implemented the tool, auditors had the essential influence on managing the auditing procedures. As novel methodology altered the role of subordinate auditors, superiors' needs and expectations in relations to the subordinate staff have also changed. A representative of superior audit staff pointed that focal problem of preserving the audit quality is in their subordinates. This is because they may commit mistakes and cause a quality issue if they have a certain level of freedom to navigate through the process. In order to diminish that risk, the tool is capacitated to prevent subordinate staff to manage procedures themselves and undergone tasks that are outside of those prescribed.

It is very important for us to have the right quality in an audit. Earlier, if something went wrong, everybody looked at the auditor and asked: "Why didn't you see this?" Auditors are trained with this GAM to make sure that we don't fail our audits. It is because of the scandals that have been in the past. (Interview with partner, AF3/INT9).

The tool is also capacitated to support subordinate auditors during the audit engagement. The tool enables them to overcome any current uncertainties without communicating with more experienced audit staff. Superiors find that the tool does not ensure quality only by managing the list of tasks, but it also support the staff in relation with any perplexities that might emerge during the process. Seemingly, the tool gives a sense of comfort to superior auditors due to the quality it warrants.

GAM gives you some kind of guarantee on the quality, and it does! It does!!! Auditors can look up at the methodology while working. They can access it through the intranet, look up things, search things, for example how to do engagement letters, work papers etc. So, it is all integrated into the tool, and tools are built around that to support the methodology. (Interview with manager, AF1/INT1).

In this regard, GAM prevents audit staff to alter any already prescribed procedure. This gives an additional assurance on quality to superiors, as the system automatically blocks any subordinate's attempt to execute procedures beyond those that are prescribed. In such cases, auditors get an automatic message that in order to commit the change they need to obtain agreement from the operation practice department.

Auditors can't do things differently by themselves. There would be some warning in the program. For doing things differently, they need to get a proof from the operation practice department, which I'm part of. So, they can do that but they need to consult department every time they do something differently. (Interview with manager, AF2/INT6).

The work environment change has brought with remarks on which superiors particularly pointed. Namely, they noticed a lack of motivation among subordinate auditors, especially at the early stages of their professional enrollment. However, they do not discern whether the root of the problem is in the changed working environment, while they only compare endeavor of staff with their own previously experienced endeavors. Also, they noted that besides of the lack of motivation, subordinates tend not to leave an impression of responsible persons.

Usually, they want to check less, that's basically their starting point. "How little can we check?" I don't know if they are lazy, but that's where they start. So, unfortunately, I would think that the starting point is "How little I can do? Education is quite good. But, I think that personality has changed quite a lot comparing to when I started. Now, auditors don't take that much responsibility for their own work. (Interview with manager, AF4/INT14).

But, superiors still show strong enthusiasm in regards the quality of subordinates' professional judgment. They perceive that GAM has not impacted professional judgment and that it still is well-cherished part of the profession.

I do believe that people still have professional judgment and doing it as well as we did it in the good old days, as I can say that nothing has changed from that perspective. (Interview with partner, AF2/INT5)

However, a representative of audit managers turned to the problem of a high turnover rate among auditors. The rate implies that subordinate auditors do not retain in audit firms for a long time, and

superiors claim that a general issue is in a work-life misbalance, which is generally usual for auditors. But that reason is only what subordinates report to their managers at the moment of resignation.

There is a quite high turnover. We have a lot of people resigning. Quite a lot, comparing to earlier! A lot of people are now leaving the company. (Interview with partner, AF3/INT9)

Given that the tool enables users to communicate with each other, it eases the interaction between them as it also potentiates communication with simultaneous access to tests and reports. However, the communication between superiors and subordinate auditors became very depersonalized, and preferences to establish personal communication fade from the perspective of superior auditors. This could be a result of pressures that the need for compliances brought with environmental changes, where the tool controls how practitioners conduct the process, so results are not so much in charge of subordinate auditors, which affects the way communication is established between auditors at different levels.

GAM also has a chat tool. The basic idea of it is to have all the communication about project inside the tool. Everything that is done in the database needs to be accepted by someone else. So it is actually a lot of the ongoing field communication in the software tool. Many of us prefer to review notes when we go through the work and send feedbacks via e-mail to our younger staff. (Interview with manager, AF1/INT1)

Proposition 3: *Subordinated auditors experience a decrease of their professional capacities due to exposure to the ICT and GAM.*

Representatives of subordinate auditors emphasized several focal issues that utilization of the tool brought to their work. The overriding problem they primarily reflect on is the impairment of professional judgment relevance. In regards to this, one of the interviewees stated that utilization of the tool foreshadows the speed over judgmental skills. This is because professional judgment is a time-consuming process, which increases costs more than the quality since the quality is in the tool than in those that work with the tool.

Basically, GAM takes away all the professional judgment from people and shifts it to filling templates and making sure that every step of the methodology was considered and responded. It drills down to a lot of small things that we need to consider and do quickly. It takes away the joy of comprehensive understanding, which is why you feel important and intellectually satisfied. (Interview with senior auditor, AF3/INT10)

The utilization of the audit tool also brought to several other reflections, one of which is the perception of the auditing industry from subordinate's angle. Auditors are assured that the industry is going towards technological capacitation instead of developing judgmental skills of human carriers of the profession. Therefore, they see that auditing is turning to a business that rather delivers standardized product instead a subjective opinion. This is because the quality is a reflection of a tool than the human resources, which characterize particular firm or the industry in general.

This is a response to audit fees' drop and switch into the commodity type of business. So, it is not really a consulting type of business but a commodity, and we need to deliver an audit opinion at the lowest price. The issue is that they are trying to squeeze the costs, make it faster and pay less to the people, and replace that with the methodology and software, which kind of makes it, even more, the commodity type. (Interview with senior auditor, AF4/INT16)

In this regard, practitioners perceive that the tool constrains them to manage the audit procedures by giving suggestions on changes, e.g. in terms of a sample size. That means that auditors rather need to focus on completion of tasks than on contributing to the quality of engagements, since they understand that superiors' expectations from them are in completion of procedures than in negotiations with them about getting a permission to extend a sample size through which they would be able to manifest their own professional judgment.

I don't always agree with the methodology, sometimes I think it is overloaded and that it does not add value for clients. Even though I would like to do some things differently as I have my own professional skepticism, in GAM, we are just asked to take like 20 samples. But why 20, why not 15 or 25? (Interview with junior auditor, AF3/INT11)

From subordinates' perspective, not only that continuously increased presence of technology reduces the opportunity to prove own judgmental capacities, but this might also affect some other things, such as employment conditions. Subordinate auditors refer to that as a long-term issue. They noticed that significance of judgmental abilities might become shadowed in the near future. They also point that methodological procedures will have even more prominence in the audit industry in the future, which will have a major influence on what would be required from auditors.

Audit industry today implements more technology and methodology, and there is less and less responsibility for decisions and professional judgment to be applied. This makes not that bright people being needed, and using more non-experienced people in the process, and requiring more averaged quality employments in the audit industry. It will rather be that less skilled and experienced people will be required in an assurance service, and more commodity and tick-mark checking procedures to follow, rather than applying professional judgment and requiring professional expertise. (Interview with senior auditor, AF4/INT15)

Auditors using the tool are experiencing how the character of the tool, in fact, moderated expectations that superiors have from them. Actually, expectations are molded according to the tool-generated list of tasks, and the speed of fulfillment of prescribed tasks gauges superiors' satisfaction with an auditor.

Working "smarter" does not mean to implement or use more knowledge and more experience, it means just to get expected results faster, cheaper and easier. That's what basically means to work smarter, not harder. It is not required from you. Do not do more - just follow the procedure! (Interview with junior auditor, AF2/INT8)

Subordinate auditors acknowledged that the problem of professional judgment also influences the comfort, which they loose or no longer experience as technological capacitation constrain them to focus on tasks from the quality perspective. This could be related to the quality issues, but since the quality is ISA determined and translated into the form of audit procedures to guarantee the quality, rather than cognitive and emotional capacities of auditors suffer under technologically developed environment.

Now, we should rather follow the methodology and it doesn't matter if we don't have that big comfort, because we've done everything that the methodology said, and it should be fine. (Interview with senior auditor, AF1/INT2)

Finally, subordinate auditors seem to be professionally discouraged by the implementation of audit methodology into the ICT. The lack of professional challenges and opportunities to demonstrate judgmental capacities take their desires for professional development away. In general, the complexity of methodology might require longer adaptation and learn time. But, the stage when auditors become conscious about the consequences that the use of the tool brings to their professional development, actually, arrives when they get more experienced with it. That is the reason for a high turnover rate of among subordinate auditors, which differs from how the reason for leaving firm is interpreted by superior audit staff.

Do you like that approach? "No! So, that is what people don't like. A lot of people say that you can get five 'monkeys' and they will make it! Of course, it is not that simply stupid, but it becomes boring after some time and in many cases you feel like a little bit bind, you can't do what you would like to do. Actually, a lot of people don't like it, so that is why they leave the company. (Interview with senior auditor, AF2/INT7)

In the overall of the previously presented findings in table 3 I provide with the outline of a number of quotations that have been extracted from interview protocols from the perspective of clusters of audit ranks. The respective number of quotations across different audit rank clusters is a reflection of the topics emerged from particular respondents rather than the actual number of individuals being interviewed.

Tab. 4: An overview of quotations extracted from interview protocols across audit firms and audit rank clusters

Audit firm	Superiors' quotes	Subordinates' quotes	In total
1	2	2	4
2	4	3	7
3	2	3	5
4	2	2	4
In total	10	10	20

Source: Authorial computation

5 Discussion

This study is centred on the research question: *How and why does the implementation of GAM into ICT impact the relationship between superiors and subordinates in Danish auditing context?*

The discussion presents proposed answer to that question by presenting meanings of previously illustrated findings related to impacts of GAM and ICT on relations and interactions between auditors of different ranks. This section is organized around two previously outlined streams of literature, but it also gives several reflections to one of traditional auditing theories on sociality of comfort production developed by Pentland (1993). Results of the analysis are discussed through the perspective of a theoretical background of Giddens' (1990) modernity theory. I believe that such a combination of facets will give a sufficient number of reflections and provide the adequate answer to the research question.

The cross-sectional analysis of the implementation of global audit methodologies in information and communication technologies and their utilization across all Danish subsidiaries of Big 4 audit firms allowed identification of a type and nature of inner mechanisms of trusts, and challenges that prevalence in one type of it brought between different carriers of the profession. Those mechanisms enable gathering an insight on how two types of trusts in two trustworthy carriers of reembedded expert systems, the ICT-based tool and subordinate audit staff, are localized at the assurance context and why one of them has the prevalence over the other. In particular, the results here inspected the consequences of negotiations between trusts in carriers of the profession from the perspective of superior auditors, but the discussion was also supported by subordinates' points of view. In short, the data indicated that the tool has a constraining influence on users (subordinate auditors) in relation to administering the audit process, and thus provides the mechanism of a remote quality protection to superiors, which finally diminishes the necessity for interactions between auditors at different levels.

Early literature on implementation and utilization of the ICT and CAATTs identified that, in the auditing context, the use of technology as a tool may positively contribute to productivity and efficiency of auditors' performance during audit engagements (Abdolmohammadi & Usoff, 2001; Banker et al., 2002; Elliot et al., 1985; Janvrin et al., 2008), and support almost any audit task (Pedrosa & Costa, 2012). But also, as presented above, the literature built on an alternative stream where scholars investigated impacts of technology and audit tools on professional judgment (Bell et al., 2002; Bonner, 1999), thoughts facilitation (Pieptea & Anderson, 1987) and decision-making skills (Adler, 1987). What both of these streams of literature omitted to consider was the actual consequences of the ICT on the interaction between auditors at different ranks, and understanding mechanisms of why is that so. By filling that gap, this study contributes to the theory of information systems in auditing, as well to the auditing theory, as it suggests a technologically moderated model of the sociality of comfort production (see more Pentland, 1993).

Findings of this study do not aim at criticizing and substituting previous theoretical models. Rather, they contribute to a clearer and deeper understanding of why the presence of technology impacts relations and interactions between differently ranked auditors. Primarily, the study here confirms that integration of methodology in the ICT and utilization of it during audit engagement actually might increase productivity and efficiency, as it was previously argued by Abdolmohammadi & Usoff (2001), Banker et al. (2002), Elliot et al., (1985) and Janvrin et al. (2008), however, in relation with ICT and CAATTs. At the same time, productivity and efficiency of GAM and ICT are positively

acknowledged across both observed groups of audit ranks. Also, results here confirm that the tool might have a strong influence on the use and development of professional judgment skills as the tool prevents them from using and developing them, as it was previously argued by Bonner et al. (2002) and Bell (1999). In fact, the range of these initiatory findings represents the baseline upon which I extend the discussion in relation to the employed theoretical background, which enabled me to argue that two opposed mechanisms of trust and the prevalence in one of them affects social interactions and relations between auditors of different ranks.

Giddens' (1990) theory of modernity has provided this study to gather different perspective on understanding how and why productivity and efficiency incentives breed interaction issues. First of all, auditing environment is characterized by an unequal deployment of ICT-based audit tools across the range of audit ranks. The work environment of superior auditors is less or minimally exposed to technology, while subordinate auditors mainly work with the ICT. However, as superiors and subordinates are occupying opposite positions in regards to the exposure to the ICT, they are also expressing contrasting reflections on the utilization of it. The results show that both superior and subordinate auditors recognize that implementation of ICT-based tools positively impacts audit quality. This confirms that social actors, generally, are reliable to capacities of technology enable guarantee of quality. Replicating the Giddens' (1990) mechanisms of modernity, a trustworthiness of social actors towards the abstract capacities of the ICT, a disembedding mechanism, enables the mechanism of trust to become materialized at the time and space dimension of reality (particular context), and according to this theory, to become reembedded. Reembedding is the acceptance and integration of factual capacities of the particular abstract system to the local context as the trust in their functionality by social actors (superior auditors) is sufficient enough for the actual acceptance.

However, results further implied that the two ranks, in fact, have opposite incentives towards the use the ICT-based tool, which imposes a question of the source of those potentially conflicting incentives. Namely, the reason for such is that the tool now takes over the function of the main carrier of the audit profession, where subordinate auditors, which are primarily exposed to the use of it, perceive that they no longer have any influence on administering the audit process, since the tool moderates their actions and engagements. So, the source of conflicting incentives lies in differences between layers of trusts and in both groups of audit ranks. Namely, subordinates tend to express trust in their own professional capacities, as they perceive that there are more suitable carriers of the profession than the ICT-based tool. On the other hand, superiors, in fact, are negotiating between two types of trusts, in their subordinate staff and in the ICT-based tool, which results in the prevalence of the latter. From the theoretical point of view, this means that there is a negotiation between pros and cons of two distinctive scenarios. The negotiation contrasts strengths of reliability in carriers of the profession, namely human and the ICT. In both cases, carriers of profession play role in producing comfort to superiors, but in the first case human carriers are producing comfort by themselves that is further transferred to superiors, while in the second case the ICT carries the profession, thus eliminating potential for experiencing comfort by subordinates, while superiors still obtain the comfort that is now differently acquired in previous stages of the engagement. Thus, the results here show that superiors are trustier to the second case. This implies that their reliability is grounded on the integration of the expert system of audit profession into the expert system of the ICT. So, one expert system mediates the other and replaces human's mediation of the expert system of the profession, as fallible nature of human (see more: Zuboff, 1988) becomes replaced by the ICT. Therefore, that implies that technology as a carrier of a profession has prevalent trust over human capacities, which reduces needs to establish interaction and communication between auditors of different levels due to the distant controlling mechanism.

The emotional element involved in professional judgment, on the other hand, provides us with an alternative understanding of how interaction and relation model between differently ranked auditors is managed under newly established condition. Pentland's (1993) model of micro production of a macro order requires revision as embedding of an additional element disturbed previously depicted sociality of the macro order. In his interpretation, macro order emerges through sociality of gradually established comforts between differently ranked auditors, as interactions and relations between auditors of different levels enable transferability of comfort from lowest to the highest positioned auditors. Therefore, a macro order was, according to his argument, conditioned on hierarchy and

personal relations and interactions between those hierarchies. However, when the tool becomes embedded to the hierarchy, it constrains reaching the state of comfort by subordinate auditors. Replacing the source of baseline comfort from social actors, as previous carriers of the profession, to the tool as a current one, in fact, substitutes pure social with techno-social gradualism of comfort. In this way lessened trust in human carriers of a profession implies that superiors' trust in technical aspects of work, being integrated into the ICT, neglects importance of interaction and establishing relations between auditors of different levels. This is due to the fact that trust in the ICT-based tool compensates subordinate's comfort and execution of tasks in ICT controlled environment, and giving sufficient comfort to superior auditors to generate the audit opinion.

6 Conclusion

The purpose of this study was to explore how and why interactions and relations between auditors at different ranks have been impacted by implementation of global audit methodology into information and communication technologies and their utilization into the audit processes. The analysis was based on inspection of auditors' perceptions in relation to the case at the assurance context. The paper here argued that prevailed trust in controlling and quality enabling capacity of the ICT-based tool (GAM integrated into ICT) displaces the source of comfort production from subordinate audit staff to the tool, which further diminishes the need for establishing interaction between superior and subordinate auditors. The data collected and analyzed in this study initially shows that both groups of audit ranks experiences positive implications of utilization of the ICT-based tool. But more interestingly, further analysis implies that their positive experiences soon get opposing tones as representatives are not exposed to the same circumstances and therefore do not have equal chances to perceive comfort. Therefore, superior auditors seem to be trustier to the ICT-based tool as a carrier of audit profession, since ICT as an expert system, which integrates the expert system of auditing enables them to be more comfortable with primarily mundane tasks, than when humans carry the profession. This still enables comfort, but only at the superior's part of the chain, and seemingly stronger than before. Hence, the results here stressed that audit quality tends not to be a product of a quality of professional skills of their practitioners, but rather reflects the technological capacities of the audit firm observed in the reduction of time necessary to produce audit opinion.

This article is grounded on the premise that interactions and relations between auditors in ICT environment are underresearched and undertheorized and that more knowledge and research are needed in order to understand how these interactions look like, and why is it so. To address the gap, this article used a theoretical background of a theory on modernity (Giddens, 1990). The theory takes two mechanisms, abstract and local (both based on trust), to break down all tangible elements that characterize the focal context, and through that enable understanding how and why trust enables functioning of social reality. These two theoretical mechanisms enabled me to reach the negotiation between trusts in two carriers of the expert system comfort and interaction at last. In such a manner conceptualized and understood context enabled me to discuss results with theories that proposed the model of social interaction in auditing, at the ICT-free environment.

The contribution of this study is twofold. At first, it gives a conceptual framework and therefore contributes to the literature on information and communication technology in auditing. Second, the study proposes a model of technologically moderated interaction as it reflects findings from the perspective of the theory on sociality of macro order production (Pentland, 1993). Besides the contributions to the theory, practitioners may also benefit from this study. It is important to stress that velocity of technological developments and prevalence in the auditing context in forthcoming years, as this might impact the profession of auditing as it may hit the development of the core property of the profession, a professional judgment. However, this study might give a universal insight to other types of professions, which have also been affected by utilization of technological advancements. The robotic nature of GAM might have an accelerating influence on increasing the level of risk of losing professional skills, as auditing has traditionally been considered as human-driven profession. Also, professional's awareness in technologically-driven quality of auditing increases the level of fluctuation of professionals, because efficiency is put in front of professional's knowledge and experience, which turns the quality of auditing into normative and standardized form, and independent from practitioners.

Nevertheless, this study is not free of limitations. First and foremost the data collection took place within big audit environment but with a small set of participants in Denmark. Therefore, this research question requires more investigation. In particular, I would suggest more research among the second-tier audit firms (regional and local) as it might be fruitful for acknowledging the current issues existing in a small-scale audit firms, and how technologization has affected professionals at those levels. Also, a current state of methodological developments, for the type of study that aims at exploring relations and interactions between social actors, might urge for utilization of other types of methods. For example, current developments of a variety of methods on social network analysis and utilization of it to the studies of auditing may provide a better understanding of relations and the nature of those relations between social actors.

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PAPER 2

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The Application of Social Network Analysis to Studies of Accounting and Auditing

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Abstract

This article aims to extend methodological abilities to conduct research in accounting and auditing by providing an overview of how current developments in social network analysis (SNA) could serve as a powerful set of theoretical and methodological tools for this purpose. SNA focuses on understanding the structure and implications of network ties. In contrast to classical quantitative methods (e.g. linear regression), SNA has the capacity to enable researchers to simultaneously explore the impact of individual-level attributes and the relational ties of network actors on network emergence. The paper notes the concept of *interdependency*, which is inherent in social relationships and which is of paramount importance in social contexts. This paper introduces a number of important SNA concepts and describes software that researchers could utilize for different analyses. The example of a one-mode network between audit partners is offered, to which several previously depicted concepts are applied and discussed. Finally, we describe the potential of a cutting-edge statistical method for SNA, the exponential random graph model (ERGM), which acts as a pattern-recognition device for network structure.

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1. Introduction

There is a fundamental divergence in the manner researchers interpret the world. On one hand, there are those who hold a substantialist perspective (i.e. an individualist entity approach), and on the other hand those who hold a relational perspective (Emirbrayer, 1997). The substantialist mode of thought is specific to their understanding of the world as a static "thing", while the relational perspective assumes that "things" are not independent one from another, and that their expediency is only reflected in their relationships with others. Such a view assumes that "things" derive meaning, significance, and identity from roles that evolve in interaction with others. This transactional perspective comprehends relations as unfolding, dynamic in nature, and ongoing processes rather than the static ties that exist between inert substances (Emirbrayer, 1997). Borgatti and Foster (2003) noted that the latter perspective has recently acquired prominence across different research disciplines.

An interest in relationships has encouraged the development and adaptation of new approaches to enable the understanding of relational mechanisms which evolve between actors in a particular context. Social network analysis (SNA) developed to serve as a method for interpreting the world by developing a means for exploring social contexts from a relational perspective. SNA provides a set of research tools for approaching the problem by putting the focus on '*relationships* among social entities, and on the patterns and implications of these relationships' (Wasserman & Faust, 1994:3). This implies that the focus of the research is not on social actors as such, but on the relationships between the set of social actors. So far, researchers in disparate empirical contexts have studied different types of relationships between social actors, including individuals, functional units, and organizations (Worrell et al., 2013).

Hitherto, research on relationships and networks has not been salient to the context of accounting and auditing. Recent literature in this field has mainly discussed topics related to the introduction of technology to accounting and auditing procedures (Bierstaker et al., 2001; Coombs et al., 1992; Debreceeny, Lee et al., 2005); motives for auditor change (Fontaine et al., 2013), comfort provision (Guénin-Paracini et al., 2014; Sarens et al., 2009) and so on. Researchers have also emphasized discussions of collaborative relationships (Sarens & De Beelde, 2006) which incorporate auditors on one side. Those studies mainly applied qualitative methods to inspect relationships by arguing that such an approach

provides sufficient insights for theorization. Others used quantitative methods such as linear regression, or logistic regression. Although each of the streams was included to study the research question from the relational perspective, SNA in such research has been neglected.

Some researchers in the accounting field discerned the importance of the relational paradigm (Johansen & Pettersson, 2013; Morrison, 2002), but they used regression method for analysis. These statistical methods assume that observations are independent from each other, which limits the tools to examine interdependencies between relationships. To overcome this deficiency, this paper introduces social network analysis (SNA) as an alternative set of methodological tools for studies of accounting and auditing in order to provide a solution to methodological challenges, which have constrained classical statistical approaches. Most importantly, this paper does not aim to replace or criticize other methods, but to inform researchers within the area of the potential of SNA.

The way that intra-group relationships operate in the contexts of accounting and auditing has not yet been investigated. Research in the field has observed relationships from the perspective of benefit exchange as a driver to the emergence of relationships, while the limitation in the use of a research tool stopped researchers from integrating subjective actor attributes in order to model network emergence. This article argues that in accounting and auditing contexts, networks of social relationships need to be explored in order to provide a better understanding of how interactions and relationships evolve, and that SNA is a useful methodology for approaching these issues.

SNA has recently developed a model that integrates the concept of *interdependency* which enabled the limitations of previous methods to be overcome. The model represents today's cutting-edge statistical method, Exponential Random Graph Models (ERGMs), and we dedicate special attention to the models here.

This paper aims to introduce the network paradigm to the studies of accounting and auditing by presenting the capacities of a network methodology and putting emphasis on their concepts and tools. The aim of this paper is thus to provide an answer to the following research question:

How can social network analysis be used in accounting and auditing research?

This paper is organized as follows: an introduction section is followed by the general concepts of social network analysis and the theoretical background of the study.

After that we review the current research in accounting and auditing, focusing on potential research applications of SNA. We introduce a list of concepts that might be used in research, together with the resources for SNA and software applicable for network research. Lastly, we discuss the abilities of cutting-edge statistical models for social network analysis, Exponential Random Graph Models (ERGMs).

2. Social network analysis (SNA)

The term 'network' has been broadly used in diverse contexts and has different meanings (Worrell et al., 2013), but the concept of 'social network' is understood as a term that refers to relationships that exist between an observed group of social actors. More specifically, it refers to the relationships between the actors that form specific configurations, and have an impact on the observed collective (Wassermann & Faust, 1994; Scott, 2013; Robins, 2015).

A social network is defined as a set of nodes (actors, vertices) and ties (relations, arcs) connecting them (Robins, 2015). Nevertheless, the term 'network' is different from that of a graph, and should not be mixed in the network studies, since graph represents a mathematical conceptualization of a network. Although the term 'social network' was attributed to Barnes (1954), SNA dates from the 1930s when Moreno and Jennings invented the sociogram (Wasserman & Faust, 1994:3) and called their approach *sociometry*, which served as a tool to depict the interpersonal structures of in-group relationships. Anthropologist Radcliffe-Brown was the first to initiate social network analysis in its non-technical form (Scott, 2013). Unlike actor-oriented research approaches, network studies investigate actors through relationships by exploring the essence of their actions through relational ties.

In SNA, it is claimed that thick webs exist between social actors such as individuals, business entities, industries, etc. (Borgatti et al., 2009). According to Robins (2015:18) social networks are comprised of actors and the relationships between them, with the relationships given in the form of dyadic *relational ties*. Relationships might differ in direction and the content they exchange, which further defines the nature of the network. In terms of direction, networks could be classified as directed and undirected, depending on whether ties are oriented from one actor to another (Wasserman & Faust, 1994:121) or not. In directed networks, an outgoing tie $x_{ij} = 1$ is different from an incoming tie $x_{ji} = 1$. Depending on the research context, ties might acquire different meanings. They can

represent transactions, the spread of information, interchange of resources, and so on, but might also represent constrained actions and the restriction of particular behavioral patterns (Burt, 1992). Relationships might thus carry positive content, such as friendship, trust, transaction, and collaboration, or negative content, such as conflict and bullying. The nature of a network study is thus, to the greatest extent, dependent on the research context and research question. From the graph theory perspective, ties represent relationships where content, direction and strength depend on the context of investigation. In conventional network research x_{ij} is a mathematical representation of a relational tie between two actors, namely i and j . All relationships have value, and might be either binary, when indication of presence $x_{ij} = 1$ or an absence $x_{ij} = 0$ of the tie are, or weighted, where the weight of the relationship gives an indication of the strength of a tie. To this end, nodes and the edges commonly enable social actors to be seen as a micro-social system (Lusher et al., 2010). Essentially, the method circumvents the inspection of attributes in isolation and binds them together with the relational ties to simultaneously examine interdependencies between relationships, as well as any effects the attributes may have on the ties.

Actors and ties might create different types of networks: (1) unipartite, (2) bipartite or (3) multilevel network (Robins, 2015: 44). A unipartite network is comprised of one type of actor and the relational ties between them (e.g. all employees in an organization). A bipartite network is composed of two groups of actors and the ties connecting them, while a multilevel network also incorporates two types of social actors but with ties both between the different types of nodes and the same type of actors (i.e. relationships between managers, and relationships between projects). An examination of multiplex relationships is also feasible using this methodology (see Brennecke & Rank, 2016). Previous networks types are known as *sociocentric* because they focus on the overall network. Networks could also be observed from the perspective of a particular actor, and such networks are known as *egocentric*, *egonets*, or *personal networks* (Robins, 2015:82).

Several studies had a substantial role in the development of SNA. Starting from the argument that existing social relationships underpin economic behavior, Granovetter (1985) introduced the concept of network embeddedness. Moody and White (2003) extended the former argument by emphasizing that the network structure is comprised of ties, and the elimination of nested actors disturbs the cohesion of the group. Several assertions have been used as a baseline for other studies that discussed the small-world phenomenon

(Watts, 1999), cognitive social structures (Krackhardt, 1987) and network emergence (Stuart & Sorenson, 2007).

Borgatti et al. (2009) and Stuart and Sorenson (2007) noted an explosion of interest in network methodology among researchers. SNA was used as a useful tool for analyzing intra- and inter-group relationships in a variety of fields such as sociology, politics, medicine, social psychology, business, management, mathematics and anthropology. Even though network concepts had pioneering applications in sociology (Bauman, Faris, Ennett, Hussong, & Foshee, 2007), psychology (Moreno, 1934) and anthropology, SNA has been extensively used in politics (Gil-Mendieta & Schmidt, 1996) health studies (Hirdes & Scott, 1998; Killworth, Johnsen, McCarty, Shelley, & Bernard, 1998; Mikolajczyk & Kretzschmar, 2008) and for addictions (Braine et al., 2008). SNA has also been applied in cultural studies (Chen, 2015; Ziegler, 2008), cognitive social structures and advice networks (Bondonio, 1998; Borgatti & Cross, 2003; Kilduff, Crossland, Tsai, & Krackhardt, 2008; Krackhardt, 1987; Lomi, Lusher, Pattison, & Robins, 2013), social media (Lewis et al., 2008; Tamburrini et al., 2015), legislation (Desmarais, Moscardelli, Schaffner, & Kowal, 2015), research (Lieberman & Wolf, 1997), and multiplayer online gaming (Shen & Chen, 2015).

3. Social network analysis concepts

In this section, we introduce several SNA concepts that we use to elaborate our empirical case of an audit partner network. It is important to emphasize that some concepts are universally applicable to a broader range of studies, while the others are more specific and applicable to some studies. Thus, it is necessary to adjust the list of concepts to the empirical case in order to produce significant insights.

Degree and density

Density is one of the basic concepts and measures in formal social network analysis and represents the general level of linking between the nodes in the graph. In mathematical terms, density represents the proportion of present ties relative to all possible ties (Scott & Carrington, 2011). Density varies between 0, which indicates that all possible ties are absent, and 1, which indicates that all possible ties are present. A complete graph, though rare, has a density of 1, which means that all nodes are adjacent to one another (Scott, 2013). Density gives a measure of the overall connectedness between actors in the network.

The size of the network directly impacts the density, thus networks that are larger in scope are likely to be less dense, even if individual nodes have on average the same number of ties as small-scale networks.

Despite its simplicity, the measure of density is crucial for understanding the general properties of a network, and depends on inclusiveness and the sum of degrees of its points. Barnes (1974) distinguished two separate standpoints in determining density, egocentric and socio-centric, which depend on whether the perspective is a single social actor (egocentric network) or the overall network.

The measure of *degree* gives information on the number of ties between a single node and all the other nodes in the network. In a directed network, we can distinguish between indegree (the number of incoming ties to a node) and outdegree (the number of outgoing ties from a node). By using degree we can summarize the overall distribution of ties – known as the degree distribution – which gives information on the variability of ties between actors in the network.

Homophily

Researchers in various network studies have demonstrated that social actors tend to associate themselves with those similar to them in a particular way (Freeman, 2008; McPherson, Smith-Lovin & Cook, 2016). Homophily is the principle according to which network emerges, and implies that ties are more likely to turn up between similar social actors. In common parlance, homophily refers to the observation that *birds of a feather flock together*. The homophily principle creates niches by localizing the positions of the vast majority of social differences that are present across society, and which can be classified as status or value homophily (McPherson et al. 2001). Using SNA it is possible to identify and understand which actor attributes seems to be important for network emergence in a particular social setting (Lusher, Koskinen, Robins, 2013:90). Homophily is referred to as a social selection process, where a tie comes into being because of the same or similar attributes of two nodes. This selection process is based on the equality in attributes of connected social actors, such as age, gender, ethnicity, race, education or other context or profession-related similarities.

Reciprocity

Reciprocity is the tendency towards mutuality of relationships in a network. The concept is specific to directed networks because reciprocation and exchange are fundamental human social processes (Robins, 2015:29). Reciprocity can be described in lay terms as *you scratch my back and I'll scratch yours*. Reciprocation is often connected to the involvement of positive emotions, but it should not be expected that one-sided relationships are reciprocal. There are some social contexts, for example leadership and business hierarchies, where reciprocity is unlikely to occur due to the nature of relationships between social actors. Note that ties in undirected networks do not necessarily suggest reciprocity since the direction of the tie is not determined.

Transitivity

Triangulation is a process of establishing triads, which are comprised of three actors and the relationships between them (Cartwright & Harary, 1956). In lay terms, transitivity can be best depicted as "*a friend of a friend is a friend*". It also involves network closure since a 2-path becomes closed by an extra tie, which produces a triangle. Transitivity refers to the social mechanism that results in clustering or the cohesion of the network. Triads are seen as the smallest form of a group with a majority, and are thus seen as the building blocks of many social networks.

Studies usually report transitivity effects by calculating clustering coefficients, which in non-directed networks can be distinguished as (a) global and (b) local coefficients. The former coefficient represents the entire network, while the latter represents the density of alter-alter ties observed from the egonet perspective (Robins, 2015:185). Transitivity is more complex for directed networks, because the presence of three arcs does not necessarily imply the presence of transitivity (Robins, 2015:180). That is, three ties in a triad could also go around in a circle, such that A chooses B, B chooses C, and C chooses A. This is known as a cyclic triad, and represents the concept of generalized exchange, however, beyond dyads, triangulation between social actors has the power to give an indication of how the network as a whole may be held together, and identify clusters of actors within the network.

Cohesive subgroups

Cohesive subgroups are understood as subsets of nodes representing social actors with substantially greater density compared to the rest of the network. The most common form of cohesive subgroup is the *clique*, which is a complete subgraph that contains all possible ties. Since cliques have tendencies to overlap, and detecting them might sometimes be an issue, but Borgatti et al. (2013) have developed a method to overcome that problem.

The literature has recognized the importance of relaxing the criteria for cliques, which brought to light other cohesive network subsets such as k-plex, k-cores and n-cliques (Robins, 2015:185; Scott, 2013:113). The literature emphasizes that, in the context of cohesive subgroups, the notion of density transmutes to the notion of connectivity, thus emphasizing the trade-off to geodesics from density, comparable with the rest of the network. A geodesic is the shortest possible path between two nodes. Geodesics are important for cohesiveness, and the lower value they have, the more cohesive the subgroup is, which implies the presence of shorter paths that are known as small-world phenomenon (Watts, 1999). From a social perspective, subgroups are differentiated by norms, which suggests a different extent of cohesiveness within the observed group (Wassermann & Faust, 1994, Ch. 7).

Centrality

Centrality originates from the sociometric concept of a "star" (Scott, 2013:84) and reflects the prominence of a social actor within the observed network (Robins, 2015; Lusher et al., 2013). Freeman (1979) has defined nine centrality measures according to three conceptual foundations, and Robins (2015) has outlined five different types of centralities for undirected graphs, stating that *degree centrality* and *betweenness centrality* are the most widely used centrality measures in social network studies, while *closeness*, *eigenvector* and *beta centralities* are specific for particular types of studies.

Degree centrality is an intuitive notion of the activity of a single node, and since it isolates the most active or the most popular node, it is a measure of local centrality (Scott, 2013:84). According to Freeman (1979) local centrality is a relative measure of which the actual number is related to the maximum number it could sustain, however, global centrality is expressed in distances among nodes, if the node lies at short distances from many other points (Scott, 2013:86). The betweenness centrality of a node is built around the concept of local dependency, and represents the extent to which a particular point lies

between various other points in a graph. This measure could also be interpreted as brokerage or control, which in empirical contexts is recognized as a function that a social actor carries while communicating through the network.

For directed networks, centrality measures could further be split into the in-degree and out-degree, which accounts for the direction of arcs (Borgatti et al., 2013; Knoke & Burt, 1983). It is also important to note that social actors might occupy a more central position in a network due to the other ties and attributes they have. In general, the concept of centrality should be distinguished from centralization, since the latter extends the concept of density as it inspects how cohesion is organized around particular focal points. Centralization is a measure of the overall network and gives an indication of how centralized a network is, whereas centrality refers to the prominence of individual nodes within the network.

Structural equivalence

Structural equivalence is grounded in the argument that equivalent social actors tend to establish equivalent relational ties. The categorization of social actors with particular groups e.g. teams, departments, functions etc. is related to the concept of a block, which is defined as a set of structurally equivalent persons with respect to other such sets that lead to the development of blockmodels (White, Boorman, & Breiger, 1976; Robins, 2015:187-8). Since individuals belonging to the same block might be different to some extent, it is important to weaken the criteria for the analysis since the perfect match between individuals is very unusual in any social context.

The concept of structural equivalence involves equivalences between social actors according to the class of positions they occupy, in the particularity of the social context (Scott, 2013:121; Wassermann & Faust, 1994:357). White, Boorman & Breiger (1976) interpreted a blockmodel as an abstract pattern among a few aggregate units that characterize more detailed interactions between larger populations of individuals. They produced a reduced graph where nodes represent positions rather than individuals (Wassermann & Strauss, 1994:362-3).

Structural holes, bridges and network brokerage

Social actors standing between different social groups are called bridges, and those individuals are critical for network cohesiveness. Those actors that bridge regions are in a

position to benefit from occupying a brokerage or network entrepreneurial position (Robins, 2015:32), but their removal affects the group's cohesiveness (de Nooy et al., 2011). Mathematically, actors in brokerage positions tend to have higher values of betweenness centrality irrespective of degree centrality (Robins, 2015).

Burt (1992) proposed the theoretical concept of structural holes, and argued that social actors occupying such positions might yield different benefits. In this theory, Burt (1992:5) asserted that people are vehicles of structurally induced actions, whose incentives to occupy better social positions are grounded in the structure of social relationships for which actors compete. This theory is not a theory about competition as such, but rather a theory about the benefits that are the product of relationships (Burt, 1992:5). Burt suggests that the opportunity to yield benefits lies in the capacities of individuals to identify loose and not yet bridged subgroups, which may result in, for example, better ideas (see further, Burt, 2004). This is the result of an uneven spread of information as which first reach those that are better connected with others before the average actor receive the information. This is not related to the issue of secrecy but to network structuring principles, as well as trust (Burt, 1992:15). Therefore, for relationships and positions, *who* you know is a more important question than *what* you know.

4. Collecting social network data

The collection of relational data is a complex task, and collection procedures fundamentally depend on a type of research question (Robins, 2015:63). As data collection processes always occur in a particular setting (Robins, 2015:123), their actual properties, to a large extent, determine the complexity of data collection procedures, for example whether the social groups at stake are formally defined or not (Marsden, 2011). Prior to each data collection process, a researcher should provide answers to three questions which are collectively known as the 'boundary specification problem' (Marsden, 2011): (1) Who are the social actors and what attributes are relevant for the analysis? (2) What are the ties connecting them? and (3) What is the boundary?

There is a range of data collection methods available to researchers in network studies, such as surveys (roster or recall method), interviews, observations, archival sources, contact diaries and longitudinal and relational event data (Robins, 2015:124-30). Depending on which data collection method is employed, the transformation of raw data

into the format that is suitable for network analysis could be an extensive task. Importantly, SNA research is focused on observing the presence of network ties in a particular social context, but it is also important that researchers observe where ties do not exist, as that might provide additional input for understanding the properties of the network (White et al., 1976).

To put the collected data into a format appropriate for the analysis, a complete list of identified relationships should be used to generate a square² adjacency matrix ($n \times n$), which in the case of undirected ties contains the same information twice, around both sides of a main diagonal. On the other hand, if the network consists of directed ties, then rows in the matrix represent the senders of the outgoing ties, while columns represent receivers of the incoming ties. In that case information around the main diagonal might differ, since ties do not necessarily imply reciprocal actions. The diagonal refers to self-nominations but is often fixed to zero, as self-ties do not always make sense in networks (e.g. in a friendship). A developed matrix could be also used to visualize networks, as a graphical representation of formal data, which is not easily observable from the raw adjacency matrix. Figure 1 indicates the correspondence between a sociomatrix and network representation for an undirected network.

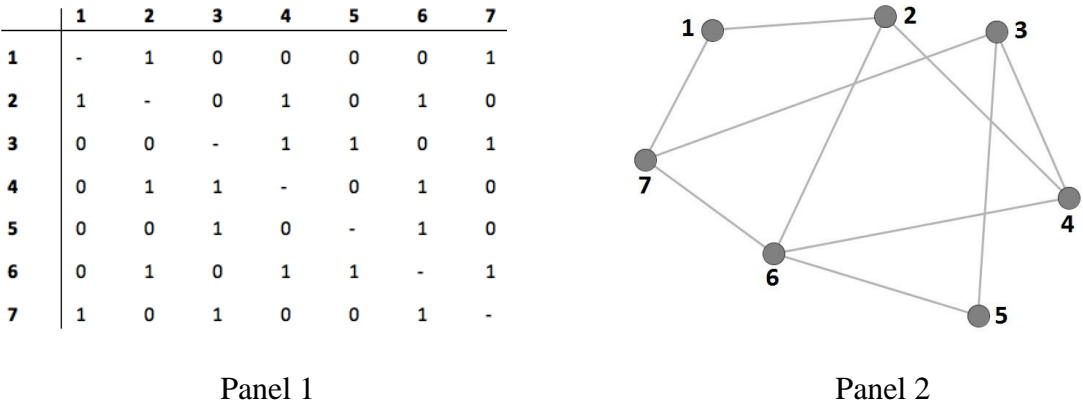


Figure 1 - Demonstration of audit partner collaboration network. Panel 1 represents a 7 x 7 collaboration sociomatrix ("who works with who"), and Panel 2 is a representation of a social network that corresponds to the sociomatrix

² For one-mode networks the adjacency matrix is square, but for two-mode networks the adjacency matrix is often rectangular, reflecting the fact that two nodes sets are of different sizes.

5. Resources for social network analysis and software

A comprehensive introduction to methodological, theoretical, and practical aspects of SNA has been provided by Wasserman and Faust (1994). They have provided an exhaustive explanation of network-related concepts, including structural configurations, attributes and network dynamics. The edited work of Scott (2010) is also a highly recommended introduction to SNA. Robins (2015) has developed a comprehensive introduction to network concepts for empirical research purposes, and provides guidelines and precautions for researchers, including ethics and other issues. An edited work by Lusher et al. (2013) on the theory, method and application of ERGMs has expanded previous work by providing a one-stop-shop for complex methodologies for the statistical quantification of network interdependencies and substructures.

A wide range of software packages has been developed for network researchers to enable network analysis, however, the capacities of various software solutions do differ considerably. Broadly speaking, software might be classified based on whether it is specialized for network representations, general data analysis or statistical modeling. Not all software enables representations (or network graphs, or maps), but some do, such as Visone (Brandes & Wagner, 2004), Pajek (de Nooy, Mrvar & Batagelj, 2011), Gephi (Bastian, Heymann, & Jacomy, 2009), Netdraw (Borgatti, 2002), and NodeXL (Smith et al., 2009), which is an add-on to Excel. Those wishing to conduct a large variety of statistical network analytics might use UCINET (Borgatti, Everett & Freeman, 2002), although most of the above programs also have some of this functionality. For more complex statistical modeling of social networks, such as exponential random graph models that utilize complex dependency assumptions, PNet (Wang et al., 2006) and MPNet (Wang et al., 2013), as well as Statnet (Handcock et al., 2004) are recommended. Finally, RSiena (Ripley et al., 2016) is suitable for the statistical modelling of longitudinal networks as it uses a stochastic actor-oriented modelling approach to delineate social selection process by incorporating the concept of time observed through the process of network change. Most of these programs are freely available for noncommercial use or for a minimal fee, which provides an opportunity for researchers in accounting and auditing to explore the current state of methodology for network analysis and inspect which software are most appropriate for their study.

6. Empirical case of social network in auditing context

In this paper we examine the case of an audit partner network in Denmark in order to represent the descriptive and explanatory capacities of SNA through the discussion of several previously represented network concepts. The social aspect of auditing in the Danish context is organized in a manner where, usually, two audit partners manage the engagement and the team, and which are responsible for the quality of final audit reports. In this case we aim to capture the structure of the audit partner network in order to observe their collaborations in respect to their affiliations. The auditing context is particularly interesting because the later technological advances (or other personal motives) accelerated the fluctuation of audit staff between audit firms, and outside the audit industry.

Relational ties between audit partners represent their collaborations on single audit engagements. All partner-to-partner collaborations, as well as single partner engagements, are captured for the period from 2010 to 2014. Repeating collaborations are excluded from the study so no weighted tie effects were observed. The population of Danish audit partners responsible for audits was narrowed down to the sample of those whose clients were Danish publicly listed companies (Nasdaq OMX Copenhagen). All Danish public companies are obligated to deliver their annual statements to an independent audit review. The auditors that were responsible for the audits signed their reports, and their names stand together with the information of their affiliation, because Danish regulation requires the transparency of personal information regarding responsible auditors and their affiliation. This requirement enabled us to extract all present collaboration ties between audit partners across the entire range of sampled companies. The selected period enabled us to observe the agglomerate of auditors over time, and by plotting all their collaboration ties we could inspect and discuss the majority of previously delineated audit concepts, which, in relation to the single year network, would not be insightful since few movements of auditors might be observed within a single year.

We followed Scott's (2011:41) argument that relational data could be obtained from documentary sources, surveys and ethnographic investigations. Documentary sources were the primary data collection method here, and we combined the following: (a) Danish registry of companies (*Virk.dk*) and (b) official company websites, to gather annual reports from which we mined the relational data necessary for representations and analysis. The final dataset consisted of 774 annual reports, which were used because they contain

disclosed signed audit reports. All relational ties that were extracted from the data that is shown as a network in Figure 2. Due to the nature of the data, it was not possible to determine the direction of ties, so the network is undirected in this particular case.

We first extracted the entire list of collaboration ties for each of five observed years in order to generate the unique database. In the next step we converted audit partner names into IDs to facilitate data manipulation, based on which a binary matrix and representation were developed. We used a perennial approach as we assumed that the examination of a single year would not provide interesting insights. We decided that a five-year period was sufficiently long to capture interactions between audit partners with different affiliations, as well to intercept their network positions across the overall structure. This then enabled us to create the auditor network that is used for discussion of the different network concepts introduced.

6.1 Empirical example and statistics

The network presented in Figure 2 is a representation of the collaboration network that unfolded during the period of 2010 - 2014 among audit partners in the Danish audit context. Nodes in this network represent audit partners who are interconnected by the ties that formalize their collaborations on a single audit engagement. Nodes are distinguished by shapes (triangle, square, rhombus, trapezoid and circle) which denote an auditor's affiliation with the particular audit firm. A circle represents audit partners that are affiliated with non-Big 4, while all other shapes delineate representatives that are affiliated with Big 4 audit firms, however, as the network captures period of five years, to properly interpret the network only shapes from an initial auditor affiliation have been taken into account in Figure 2, regardless of the year in which a particular auditor first appeared in the network.

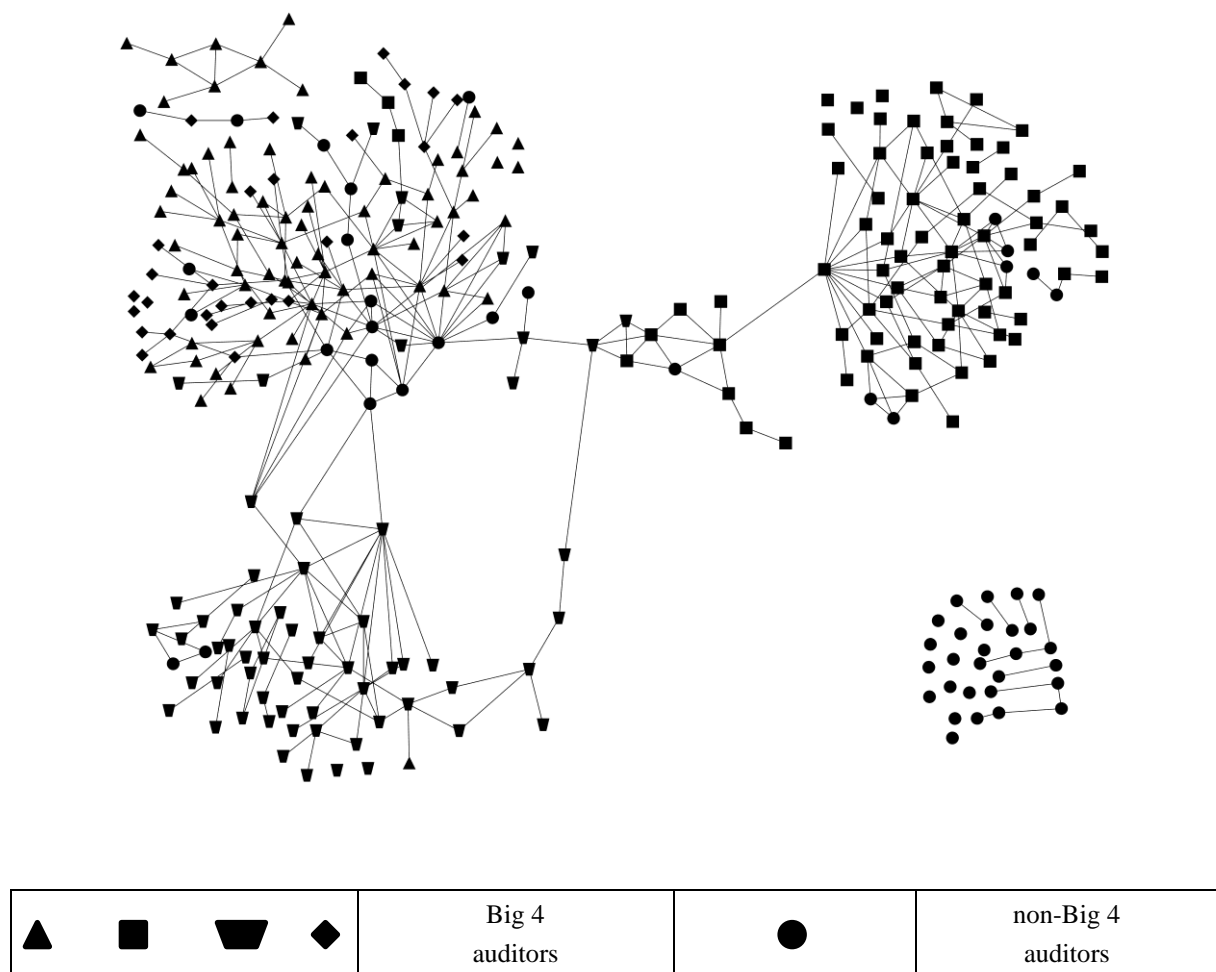


Figure 2 - Representation of the audit partner collaboration network and affiliation change network ($n = 296$, $x = 718$, $\Delta = 0,8\%$) for the period from 2010 to 2014

From the representation in Figure 2 it is notable that the network is composed of three mutually connected clusters where individuals belonging to each are primarily the audit partners who were initially affiliated with a Big 4 firm. The upper right and lower left clusters significantly differ from the upper left cluster due to a relatively homogeneous structure of representatives. In those two clusters, audit partners have retained their initial affiliation over the entire period of observation, or have not been previously affiliated with any other audit firm. Such a clear structure implies that partners are engaged in audit firms over the longer period, irrespective of minor newcomers who were previously affiliated with a non-Big 4 company. On the other hand, it is notable that the upper left cluster is a highly intersected region. It is possible to propose here that the lack of four highly clustered regions in the Danish context is a result of the two Big 4 mergers that occurred in 2008 and 2014, which resulted in the emergence of a notably heterogeneous cluster. The bottom right group of isolated auditors is primarily comprised of non-Big 4 representatives. This is a

sparsely tied locality where rare collaborations and auditors integrate those partners who were affiliated with the remaining eleven audit firms.

Table 1

Descriptive statistics of the observed network of audit partners in the Danish context

Network statistic	Description	Estimation
Number of ties	Total number of ties present in the observed network	718
Average degree	Average number of ties adjacent to a given vertex	2.426
Density	Ratio between present and all possible ties	0.008 (0.8%)
Graph centralization	Overall cohesion of the graph	0.0361 (3.61%)
Network centralization index (Betweenness centralization)	Network cohesion around the focal vertices	0.2049 (20.49%)
Transitivity	Density of transitive triplets in a network	0.069 (6.9%)
Overall graph clustering coefficient	Mean of open neighborhood of each vertex densities	0.264

In Table 1 we give an outline of selected quantitative measures related to the descriptive statistics of the network that we further discuss. The network captures 718 unique collaborations in total, among 296 auditors. Auditors on average collaborated with 2.43 different auditors over the five-year period. Multiple collaborations with the same auditors were excluded from the presentation. The entire network has relatively low density ($\Delta = 0.8\%$). This might be ascribed to regulatory and other boundaries, which together constrain the number of partners involved in a single audit engagement. The number of engagements of each auditor in a single year might also be predetermined at the audit firm level.

The graph has a degree centrality (overall network centralization) of 3.61%, which gives an indication of the variance of degree inequality between present actors. In other words, this measure shows to what extent the number of collaboration ties oscillated around the average number of single collaborations for each auditor, expressed in percentage. This statistic would give an indication that, in general, auditors held relatively equal numbers of engagements on average, as the oscillation is close to zero. A measure of betweenness centrality for each node represents the frequency of nodes occurrence on a geodesic, but, the overall network betweenness centralization gives an indication of what the network

structure looks like. In our case, the index of 0.2049, which is closer to 0, shows that the observed network is less centralized, more scattered, and not likely to generate a hub.

Our case network has an overall clustering coefficient of 0.264, which represents the average measure of density in the open neighborhood for each node in the network. More specifically, it shows the degree to which two incident ties tend to become completed by a third one to create triangles (3-loops) around each node and between each other adjacent node, measured on average. In our empirical case, the coefficient shows that a little over of 25% of total auditor collaborations tend to become transitive (i.e. form triangles, or triadic relations). The overall transitivity statistic, which gives an indication of the density of triangles in the graph, is 6.9% for our network.

Structural hole theory (Burt, 1992) has gained prominence among researchers in various study areas such as organizational studies, absorptive capacity research, and more. The majority of those studies have primarily applied such theory to give prominence to the knowledge spread that emerges from those who occupy such a position, as they are more prone to generate good ideas and innovations (Tortoriello, 2015; Rodan, 2010; Burt, 2004), however, Ahuja (2000) explained that structural holes could have both positive and negative impact on innovation depending on the size of the structural hole. Our empirical case is complementary to Tan et al. (2015) who argued that only the actors present in low density networks may benefit from spanning structural holes, since denser networks and regions could weaken such effects and they may turn out to be detrimental.

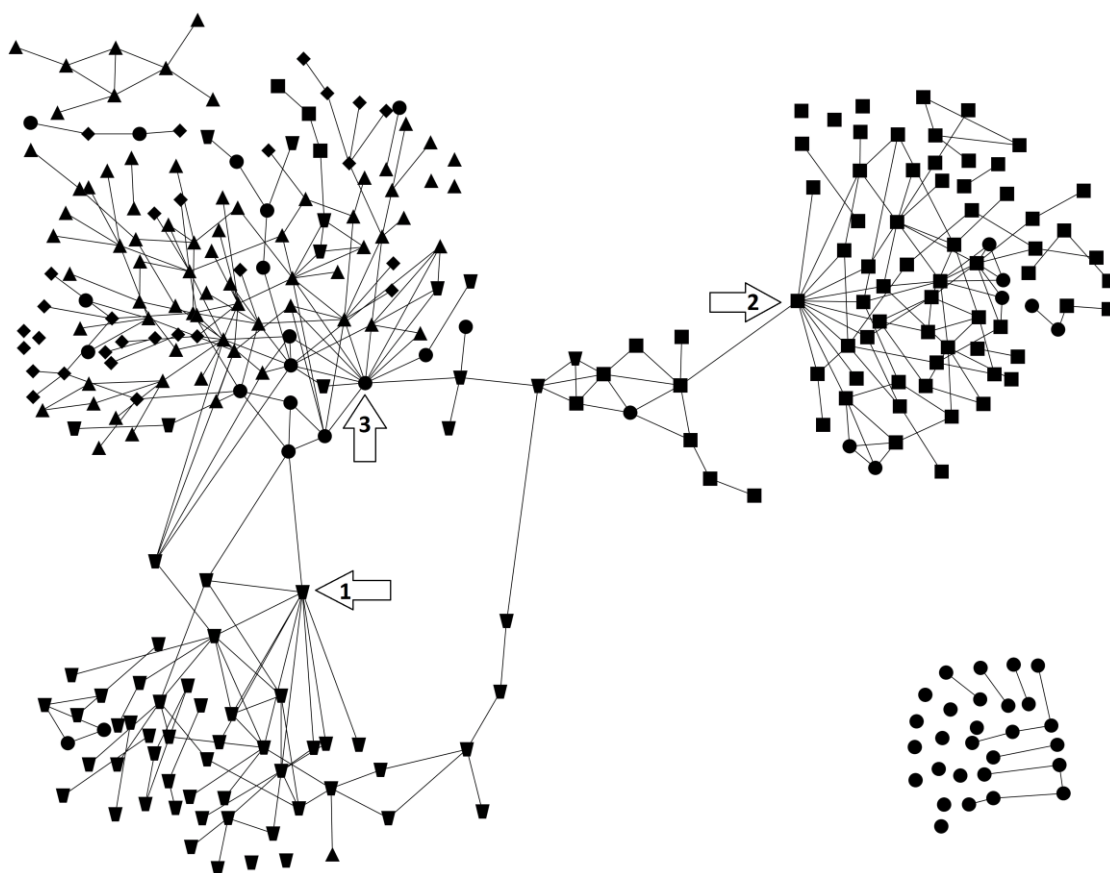


Figure 3 - Audit partner collaboration network ($n = 296$, $x = 718$, $\Delta = 0,8\%$).
Arrows point to structural holes in the network; calculation performed by UCINET
algorithm (Borgatti, et al., 2002)

In order to statistically examine which nodes occupy structural hole positions we utilized the UCINET software. The results are three nodes, indicated by arrows in Figure 3, which refer to auditors with the highest prominence in spanning highly clustered regions. This implies that partners standing at sparse network regions may also gain significant prominence over others within the denser regions, however, this empirical example further enriches a theoretical dilemma about whether the network closure effect or structural holes may yield better benefits from a network position perspective. With regard to the observed network, it is possible that in the auditing context, auditors occupying structural hole positions are significantly attractive for collaboration. This means that some auditors might acquire high popularity if they change affiliation, because they might provide additional information input related to knowledge or experience.

8. Statistical models for social networks: Exponential random graph models (ERGM)

In the accounting and auditing context, several studies have previously utilized network methodologies that were primarily based on linear regression methods. Regression hypothesizes that observations are independent one from another, and researchers using this might only be able to test how one or more independent variables influence a theoretically selected dependent variable, however, the assumption of independency of observations is not sustainable in network studies because configurations in networks emerge from local social processes; for instance, ties are unfolding as a response to other ties that exist in the network. This suggests that the assumption of interdependency is more appropriate for network studies than the classical dependent-independent assumption. In this regard, a new class of statistical models, exponential random graph models (ERGMs), have been developed to account for the presence and absence of network ties, and to provide a model for network structure (Robins, Pattison, & Wang, 2009; Robins, Pattison, & Wasserman, 1999; Robins, Snijders, Wang, Handcock, & Pattison, 2007; Wang, Robins, Pattison, & Lazega, 2013). In this section we present the main points and the power of the cutting edge statistical model in order to inform readers of the logic, rationale and capacities of ERGMs.

ERGMs have passed through different stages and had a long history before they arrived at their current state. Starting from the introduction of the network statistic approach (Moreno & Jennings, 1938), across Erdős and Rényi graph (Erdős & Rényi, 1959), Bernoulli graph distribution (Frank, 1981), the p_1 model (Holland & Leinhardt, 1981), the p^* model (Wassermann & Pattison, 1996) and conditional independence assumption, Pattison and Robins (2002) arrived at the social circuit model on which the current ERGMs were underpinned. ERGMs are defined as tie-based statistical models for network structure that permit inferences to be made about how and why social network ties arise (Lusher et al., 2013:9), but instead of observing networks through random ties, ERGMs hold the premise that networks emerge in specific configurations of ties. Configurations are small local subgraphs whose probability determines how many of those configurations are present in the network. In turn, ERGMs work as pattern recognition devices and identify parameter values for observed network configurations, which then informs researchers about the importance of each selected configuration for network emergence. Put more simply, a researcher selects a list of patterns that are based on theoretical interests and

applies this to an observed social network to estimate the parameters for each selected configuration. The results of model estimations permit inferences about network patterns (Lusher et al., 2013:10).

ERGMs have one exceptionally important feature, which is that network ties are dependent on one another. This process of network emergence is called network self-organization and assumes that the presence of one tie may affect the presence of the other ties – ties are conditionally dependent on one another if they share a node. ERGMs have taken the assumption that individuals by definition are dependent further, and assumed that the actual relationships between individuals are interdependent. This more closely aligns the method with our theory of how the social world actually operates.

There are many possible network substructures (or network effects) that a researcher might observe in one network, but depending on their interests and theoretical foundations, the selection of particular network configurations should be sufficient to provide parameter values for observed network patterns, with regard to the theory they want to contribute to. This also means that the configurations integrated into the model allow a certain level of freedom in articulating their meanings, but the level of freedom should be aligned with the particular theory on which the researcher builds their argument. For instance, if reciprocity is important to a researcher theoretically, then this should be included in an ERGM. Lusher et al (2013: 175) suggest what might be a good starting set of network effects to include as a minimum for many network studies that employ ERGMs.

The aim of ERGMs is not to predict the outcomes of individuals in the network (so-called social diffusion or social influence models) but to detect patterns that may inform the network formation processes, which also include the social selection process. ERGMs are essentially pattern-recognition devices for identifying network substructures – the building blocks of a network which help it form. Different social theories had significant influence on the development of social network analysis and ERGMs, which might explain why relational ties might be present in the network and how ties are associated with actor attributes (Lusher et al., 2013:16-17). The literature recognizes three categories of tie formation processes: (a) network self-organization, (b) attribute-based processes, and (c) dyadic covariates. While the first assumes that network ties organize themselves into patterns because the presence of ties encourages the other ties to emerge, the second proposes that social actors bring their own capacities, capabilities and predispositions into

the network (attributes). Finally, the third assumes that ties themselves have special characteristics, which, in turn, affect tie emergence.

ERGMs can be used for the examination of one-mode, multilevel, bipartite and multiplex networks. In addition, software called MPNet³ (Wang et al., 2013) is available for implementing ERGMs to enable researchers to examine whether selected variables affect network emergence. The software enables the testing of homophily, reciprocity, centrality, clustering and/or many of the other available network effects, and all at once.

It is important to note that ERGM methodology might be complex to master, but the aim of this is to inform readers in accounting and auditing of its capacity, and to draw attention to the fact that, for example, linear regression in network studies can either be used to predict attributes or the presence of ties, but not both. Since linear regression is inconsistent with the assumption of interdependence, the application of that method to network studies is considered unacceptable, and ERGM is the recommended method. To see more on ERGM theory, methods, and application please refer to Lusher, et al. (2013), introductory article on ERGMs in sport teams (Lusher, Robins & Kremer, 2010), and examples of the application of ERGMs in social studies (Brennecke & Rank, 2016).

9. Conclusion

The aim of this paper was to outline the main characteristics of SNA in order to inform researchers of how this method could serve as a powerful set of tools to approach social relationships within the context of accounting and auditing. In this introductory article we briefly outlined the history that brought the logic of the SNA to light, followed by a description of the characteristics of the methodology and fundamental network concepts. We delineated relational data and software resources that are available for network analysis, and a description of the exponential random graph models (ERGMs), as the cutting edge statistical model in social network analysis. To bring the method closer to the reader, we provide an example of a collaboration network comprised of audit partners in Denmark, which evolved over a period of five years. The example here is used as a platform to briefly discuss several previously outlined network concepts and statistics.

³ Available at www.melnet.org.au

In a nutshell, SNA is able to integrate a different range of actor attributes and examine their influence on network structure. SNA is predominantly a quantitative-based method, and it enables researchers to simultaneously examine relationships and individual-level characteristics within the focal context. Current developments in SNA are able to account for interdependence, and to provide quantitative estimations of network configurations that further enable theoretical inferences. The method replaces the measurement of individuals to networks and uses the network as the unit of the analysis, while it still accounts for actor characteristics and uses them as input for understanding network structure. It is very important to note that this introductory article does not argue for the replacement of linear regression as a classical statistical method, but for the use of SNA as an additional tool for all previously developed quantitative methods, and emphasizes the appropriateness and legitimacy of this method for inspecting the evolution of network relationships in particular social contexts.

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PAPER 3

Kacanski, S. (2016b). The Reputation Driven Interplay of Relationships between Clients and Auditors in an Auditor Selection Process: A Multilevel Network Approach. *Accepted at Journal of Accounting and Management Information Systems*.

The Reputation Driven Interplay of Relationships between Clients and Auditors in an Auditor Selection Process: A Multilevel Network Approach

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Abstract

This study investigates the reputation-based interplay between auditor selection and interlocking directorships from a multilevel network perspective. The aim of this article is to explore how and under what conditions reputation influences patterns of social selection processes in an assurance service context. To empirically determine the impact of reputation on establishing relational ties, this study applies exponential random graph models (ERGMs) for multilevel networks. The case study was carried out in the Danish field of mandatory audits, and findings here make a valuable contribution to the literature on auditor selection. A total of 774 annual reports were collected from 145 - 165 Danish public listed companies, and the relational data of companies was assembled, as comprised of the members of supervisory boards and partners who signed audit reports during the five-year period from 2010 to 2014. In this study, mechanisms for auditor selection were controlled by mechanisms for interlocking directorships in order to obtain a broader picture of the conditions under which board members have tendencies to select reputable auditors. The findings suggest that reputation has a significant impact on both observed processes, however, results reveal that reputation has a compensatory nature, as it drives both mechanisms of social selection but never simultaneously.

Keywords: reputation, board of directors, interlock directorship, network, ERGMs

1. Introduction

There are two mechanisms that drive customer demands: (1) experience (Granovetter, 1973, Davis & Robins, 2004, Powell, 1990; Podolny, 2001), and (2) reputation. In today's auditing, it is argued that reputation plays a role in setting up market structure (OECD, 2009).

Brazel and Bradford (2011) argued that before the Sarbanes-Oxley (SOX) era, external auditors were entitled to select and dismiss their clients. However, after the announcement of the SOX, when clients became able to select which auditor to use, many questions were raised in relation to the factors and reasons that clients consider when selecting or changing their auditors (Beattie & Fearnley, 1998; Magri & Baldacchino, 2004; Woo & Koh, 2001). Although, the literature in this academic field at first claimed that audit fees were the main driver influencing the selection of auditors, Beattie and Fearnley (1998) argued that fees are only the most frequently cited reason. In fact, clients who change auditors are less likely to consider economical factors (Beattie & Fearnley, 1998), but Magri & Baldacchino (2004) they found that the availability of auditors and a client's perception of their behavioral characteristics were the most important factors in the selection of an auditor. The selection and change of an auditor might have negative consequences for companies, such as to their public image (Neveling, 2006) or stock price (Asthana et al., 2010). The literature has reported that client might expect to gain better reputation if they select reputable auditor (Magri & Baldacchino, 2004). The literature has only initiated the question of reputation and the role it might have on auditor selection, however, and no study yet examined the significance of reputation on a client's choice.

The literature on the structure of supervisory boards (Palmer et al., 1986) and strategies for interlocking directorships has emphasized that boards are responsible for auditor selection (PwC, 2012). Board structures and interlocking directorships (Mizruchi, 1996) have been of a special interest to researchers ever since the concepts were first seen in the US economy. By definition, "interlocking" involves the participation of a single director in a supervisory board of at least two companies at the time (Mizruchi, 1996). Studies have showed that the existence of interlocks is an integral part of company strategies and goals, such as: capital allocation (Mizruchi & Stearns, 1988; Pfeffer, 1972), business control (Allen, 1978, 1974; Stokman, Ziegler, & Scott, 1985; Zeitlin, 1974), the formation of interdependencies between companies (Pfeffer & Salanc, 1978) and upper

class cohesion (Palmer, 1983; Useem, 1982; Zeitlin, 1974), however, Galaskiewicz et al., (1985) hypothesized that increasing prestige might be an alternative strategy to interlocking, arguing that companies select other companies that are better perceived.

Both streams of the literature have suggested that reputation might impact both selection mechanisms. Thus, regarding the assumptions that (1) reputation, as a social perception, might both be positive and negative (Brewer et al., 2002), and (2) companies that share a board member are likely to select the same audit firm (Davison et al. 1984), this paper argues that reputation has a significant impact on both selection processes (auditor and company with which to interlock), and that those processes are mutually interdependent. By adopting a network methodology, this paper aims to provide an examination of how reputations are distributed across the network of inter-company and auditor-client relational ties. The network approach used here offers a unique opportunity to challenge the previous two literature streams, and therefore, the analysis is centered on the following research question:

How does reputation affect the social selection process in the auditing context?

The paper is structured as follows. First, I present the research area, motivations behind the investigation and the research question in the introduction of the paper. Second, the background outlines relevant literature on the topic, including the theoretical background of the study. The methodology, data collection and method are then described. I present the findings of the analysis, followed by a discussion involving the theoretical background of the study. Finally, the conclusions explicitly answer the research question and delineate the limitations of the study, and an agenda is offered for future research.

2. Literature review, hypotheses development and theoretical background

Reputation in the contexts of auditing and interlocking directorships

Recent research has emphasized the importance of reputation through the role it has in determining social relations across different social contexts. Various studies have deployed their own definitions of the concept, but for this study I readapt the definition developed by Fombrun (1996:72) who defined reputation as '*a perceptual representation of a social actor's past action and future prospects that describes its overall appeal*'. Reputation is recognized as an intangible asset (Goldberg, Cohen, & Fiegenbaum, 2003) which is a reflection of a person's or social group's perception.

Researchers studying corporate contexts were interested in various aspects of reputation (Barnett, Jermier, & Lafferty, 2006). In the business world, reputation is predetermined as a fundamental resource for achieving competitive advantages, which ensure the sustainability of the business entity (Barney, 1991; Deephouse, 2000; Martínez & Olmedo, 2010). Several studies have showed that self-perception might provide insights into someone's own reputation, but the concept recognizes that reputation emerges in the eyes of others (Stuart, Hoang, & Hybels, 1999; Turban & Cable, 2003). Miles and Covin (2002) stated that reputation is fragile commodity as a result of perception, and is difficult to achieve but easily lost.

Unlike prestige which is subjective and can be only a positive value (Maner & Case, 2016; Henrich & Gil-White, 2001; Norredam & Album, 2007), reputation is an objective social concept that can be both positive and negative (Brewer et al., 2002:27-8; Henrich & Gil-White, 2001; Highhouse et al., 2009:1482), and the value of it emerges from the summative perception of an entire community (Lopez, Roman, Agudo, & Fernandez-Gago, 2010). This study will thus focus on reputation due to its objective nature, and since the collected data and the scale of the observed network did not enable subjective perceptions to be either observed or analyzed.

Various studies in auditing have discussed the implications of reputation for auditing firms and auditors. Linthicum et al. (2010) argued that auditor reputation is important for clients, and asserted that clients tend to compensate for the diminished reputation level of auditors by investing in corporate social responsibility in order to stabilize or enhance their own social position. Magri and Baldacchino (2004) assumed that clients tend to overpay in order to have their annual reports audited by reputable auditors, which implies that, in both cases clients are likely to pay more, but might select either reputable or disreputable auditors according to the incentives. Magri and Baldacchino (2004) assumed that a client's selection of a reputable auditor might also enhance their reputation, and compensate for the negative consequences of the change. Kanagaretnam et al. (2010) reported that an auditor's reputation and their earnings management are negatively correlated. This is because reputable auditors tend not to risk their own reputation, and they refuse bribes offered by clients to report favorable opinions. Sucher et al. (1999) argued that audit firm reputation is primarily based on technical and functional properties, where the size of the firm is what indicates the quality of service (DeAngelo, 1981; Salehi & Kangarlouei, 2010). Aronmwan et al. (2013) reported that the reputation of

an audit firm might affect the corporate image of a client, which implies that the selection of a Big 4 firm might enhance the credibility of a client's financial statements, compared to that of a non-Big 4 firm (Simunic & Stein, 1987; Francis & Wilson, 1988). The first stream of literature therefore shows that audit firm reputation might be of importance to clients, since clients might perceive selecting reputable auditors as increasing their own social standing.

On the other hand, the literature on reputation-driven interlocks has argued that increased reputation is a sign of improved legitimacy and trustworthiness (Parkhe, 1993). Board members perceive that the formation of an interlock with reputable companies might have a positive impact on their own reputation as well. Boards might therefore employ a cooptation strategy for business alliance formation in order to gain legitimacy (Gu & Lu, 2014), which might further be manifested in tendencies to increase proximity to those that are generally perceived as reputable (Gu & Lu, 2014). Podolny (2001) suggested that status is relationally reflexive and an awareness of its sensitivity urges actors to carefully select the other social actors, because low-status holders might lower the status of those holding a better position. This corresponds to the mechanism of opportunities and needs, and suggests that cooptation is less likely to occur if differences in perceived levels of reputation or other attributes are apparent between focal actors (Galaskiewicz et al., 1985; Gu & Lu, 2014). Overall, studies have revealed that, in the context of corporate governance, interlocks are likely to emerge between companies that hold similar socially perceived reputations.

To the author's knowledge, there were only two studies that have examined the contexts of auditor selection and interlocking directorships. In an Australian context, Davison et al. (1984) found that links between companies audited by the same audit firm can, to a considerable extent, be explained by links between those same companies when they have a director in common. On the other hand, by focusing on an experience-based demand mechanism, Johansen and Pettersson (2013) found that interlocks in Denmark have a strong impact on the selection of auditors and audit fees. The gap found in previously proposed framework urges bridging the seemingly disparate bodies of theory by discussing the question of how two reputation-driven demands are mutually negotiated through mechanisms of interlocking directorships and auditor selection.

To tackle some of the limitations of the previous literature, and theorize about the mechanism of auditor selection through mechanisms of interlocking directorships, I define two hypotheses that will be tested by conducting network studies.

H1: Reputation plays an important role in driving the demand mechanisms of auditor selection and interlocking directorships.

H2: Clients tend to select reputable auditors when they want to compensate for a lack of homophily at the level of interlocks.

Theoretical perspectives

This subsection presents the main theoretical background where the aim is to frame the space and conditions within which results of the study are discussed. Use of social network analysis, as a research method, is theoretically insufficient and the engagement of the respective theory that will provide generalizations of findings is crucial (Robins, 2015:216). I outline the theory which, I believe, will provide a meaningful framework for the discussion of empirical results.

I justify the selection of a theoretical background on the following assumption. Market demands that evolve under the condition of egocentric uncertainties, when social actors tend to select other actors who hold higher social status, occurs only when selectors are unaware of the quality that selected actor provides (Podolny, 2001). DeAngelo (1981) argued that the audit market is just like that, because clients are unable to gather insight into the quality of the audit service. In general, social actors might enhance their legitimacy in the eyes of the others by forming relationships with those that are reputable (Baum & Oliver, 1992), selecting those of higher rather than lower status (Podolny, 1993). In such a way, they are being influenced by previous quality uncertainties to enter the zone of "conspicuous consumption" (Podolny, 2001), which they use to demonstrate their belonging to the group of those that are reputable. Consequently, it appears that social actors tend to connect and identify themselves with others as they use the status of others to increase recognition within their own environment. According to Zuckerman (1999), patterns of relationships formed by firms are not only relevant for the exchange of, for example, information or services, but for those patterns might have an impact on the perception that third parties have of social actors and their engagement in relationships with others. Taking that into account, in addition to auditor selection companies establishing interlocks, it is questionable how patterns of relational ties emerge at the network level.

Correspondingly, the theoretical framework of this study is given by a combination of elements that have been outlined by reputation and identity theory. Despite notable similarities in conceptualizations of reputation across various theoretical standpoints, theorists have occupied different perspectives and grounded their theories on different assumptions, allowing researchers to select the most appropriate one (Musum & Tovey, 2011; Burke et al., 2011; Craik, 2009). Central to this study is the viewpoint of Craik (2009) who argued that the concept of reputation always operates within networks of social relations. His assertion was that reputation is not located on or in a person, but it is a dispersed phenomenon found in the beliefs and assertions of groups. It is therefore a part of the social environment that is uniquely referenced to a specific social actor. In general, any discussions related to reputation are often vague in terms of who it is that holds beliefs and assertions, but the subjects of the reputation are clearly specifiable, finite in number, and unique to each social actor. More specifically, Craik (2009) developed a network-based model of reputation, and asserted that it has systematic implications for the diversity of disciplines, including the social network analysis. In this theory, he suggested that a change in reputation network might emerge as an initiative that is triggered by social actors. Such a premise implies that reputation might recreate structures of social relationships, where a particular actor's incentives determine the distribution of network dynamics. Craik's (2009) theory conceptualizes reputation network as a structure of relational ties where social incentives, which might be different in nature and contextually independent, determine and restructure the network configuration. In this study, reputation is understood as a variable that is independent from network ties as it gives an opportunity to observe the change of the network structure over time, which is the main unit of the analysis, and context specific.

To reflect the incentives of social actors, reputation theory requires the support of an additional theory that will enable the proper discussion of findings. According to Fombrun (1996) five factors are critical for establishing reputation at the corporate level, and one of these is *identity*, which Fombrun interprets as seeing an organization as genuine. To integrate the notion of identity into the network study of reputation in terms of the dynamic nature of relationships between social actors, I assume that it is legitimate to inspect how social actor incentives could be linked to particular social identity scenarios, and which scenarios could be particularly ascribed to incentives for social identification by observing the characteristics of network configurations. Bringing this closer, the use of this theory

will enable a determination of whether reputation might be asserted to serve as a mechanism or a tool for boosting social identification.

I use theory developed by Tajfel and Turner (1979) who grounded their main propositions on theories of intergroup behavior and intra-group morale, cohesiveness and cooptation. Three principles are fundamental for actor entities seeking social identity: (1) individuals always strive for positive social identity; (2) which is, to a large extent, based on favorable comparison; (3) but in the event it becomes perceived as unsatisfactory, social actors might switch to others that are perceived as more positively distinct. Tajfel and Turner (1979) define three strategies for enhancing identity: (1) individual mobility - as a strategy for dissociating from the erstwhile group and joining the other, (2) social creativity - to seek alternative criteria for comparison when no change occurs, and (3) social competition - as an aggressive scenario of seeking positive distinctiveness through direct competition of the out-group.

To conclude, if it is accepted that reputation has a given value that drives network structure, and that incentives for acquiring reputation are changeable and conditioned on relationships, and that establishing relationships with reputable actors might be used as a tool for boosting social position by identifying through that relationship, it could be argued that the network theory of reputation and identity theory might give a solid basis for the interpretation of findings.

3. Methodology

The Danish regulation and corporate context related to auditor selection

The Danish corporate governance system of publicly listed companies involves two tiers, and comprises a supervisory board, which appoints an executive board. Depending on which type of top tier is employed, the Danish corporate governance system might be categorized as either a 'classical' or 'modified' two-tier system, and accordingly, representatives sitting on those boards have different responsibilities. In Denmark, public listed companies follow a classic two-tier structure, and the modified system is also applied to some extent. Disregarding the previous categorization, representatives of the top tier boards have different responsibilities, such as determining business principles and strategies, ensuring proper organization, deciding on risk policies and supervising the performance of the executive management.

In addition to responsibilities, Article 41 from the 2006 amendment of the European Directive on statutory audit prescribes an obligation for the board to make a decision of appointment of the auditor, which, once made, should be announced at the annual general meeting (AGM). In practice, supervisory board members make the final decision on auditor appointment, but their decision might to some extent be moderated by the recommendation of an audit committee, if present. Only a small sample of companies has separately appointed audit committees, however, which, if present, usually consist of members of the supervisory boards. If an audit committee is not appointed, the board of directors must be explicit in announcing that they take the overall responsibilities that are in jurisdiction of the audit committee.

For the purpose of this study I take into consideration only representatives of supervisory boards, since they are fully liable for appointing an external auditor. I do not distinguish the formal positions of members on boards, and assume that each member might equally effect a decision about the appointment of the auditor. The top tier in the corporate governance structure was selected for this study, as their representatives might simultaneously occupy multiple positions on the boards of different companies, and by chairing at multiple tables might equally impact multiple auditor selection processes, by choosing the same auditor.

Some features of regulation have affected the research design. From 1930 all listed companies in Denmark were obligated to appoint two audit firms, but joint audits were abandoned in 2005. In Denmark, information on the audit partners that signed the audit report is transparent, and it is not uncommon that two partners sign off on the same audit report. This has enabled me to identify the audit partners that were responsible for the audits and relate that information to a particular company, instead of the information of the auditing firm. Usually, up to two partners put their signatures on the report, but there are some examples where two audit firms collaborated on a single engagement, which resulted in four partner signatures on a single audit report.

Data collection

The data here covers the five year period from 2010 to 2014. I selected that period because there were no changes in regulations for mandatory audits in Denmark, and the period was uninterrupted by mergers, which were, by all means, very specific to the Danish audit

context, since two huge mergers took place in 2008 (PwC) and in 2014 (KPMG), in Denmark.

In order to investigate interdependencies among the relationships between two types of social relations, companies sharing board members and their relationships with auditors in the context of auditor selection, I collected and extracted relational data from publically available annual reports for the purpose of this study. Relationships were extracted from the reports that were taken from the sample of Danish companies listed at Nasdaq OMX Copenhagen in each year of the observed period. A complete list of companies representing the sample was taken from a monthly report on equity trading from the 31st of December in each of the five consecutive years. All relevant annual reports were either collected from the official websites of companies, or via the online registry of Danish business entities, *Virk.dk*, which contains information and documents, such as annual reports, for all business entities in Denmark. Investor relationships departments delivered missing data via e-mail.

For this study 774 annual reports were collected in total, respectively 165, 162, 153, 149 and 145 for each year of observation from 2010 to 2014. As the number of collected annual reports corresponded to the size of the sample of business entities included in observations, a condition of completeness for network studies was fulfilled. The sample includes both financial and non-financial organizations, and a total of 191 unique business entities were included in the study. , The structure of business entities slightly varied over the period, however, since some companies were listed and delisted during the time, which suggests that the inventory was not entirely stable. In total, information about 1761 board members was extracted and the data included 297 audit partners who signed off on the reports of 191 company, which were affiliated to, in total, 17 audit firms.

Reputation data was collected from two separate sources. At first, information related to company reputation scores was extracted from the annual RepTrak® reports issued by the Danish branch of the Reputation Institute in each respective year. The institute provides quantitative measures of company reputation scores that are appraised based on the following seven categories: product/service, innovation, workplace, governance, citizenship, leadership and performance. The quantification of each of these categories was used as an independent measure whose sum gives the final score reported in percent, and refers to both private and public companies. For the purpose of this study, only reputation scores related to relevant companies were extracted, but since the observed

sample did not match the list of companies being appraised by RI, the entities omitted were assumed to be disreputable. This further supported the assumption that prestige, which is a highly subjective perception, could not be used in this study. On the other hand, in relation to the reputation of audit firms and auditors, I followed the arguments of Kanagaretnam et al., (2010) and McLennan and Park (2016), who primarily used a two-type classification of audit firms as a reputation proxy, Big 4 and non-Big 4 (Fuerman & Kraten, 2008; Aronmwan et al. 2013). This classification implied that the first group was reputable, and the latter were disreputable audit firms. Following that classification, and since this study deals with individual auditors rather than audit firms, I used auditor affiliations to proxy their individual reputation scores.

To put the data in a form appropriate for statistical modeling, raw relational data was first extracted to a unique spreadsheet from which relevant information was selected and converted to a .csv format readable by Visone, which is a network visualization tool. In addition to visualizations it also provides an opportunity to export relational data from a visual form to an adjacency matrix in .txt format that is further readable by MPNet (Wang, Robins, Pattison, & Lazega, 2013), which is the software used here for statistical modeling. The extracted data finally produced estimations for five statistical models that will be discussed below, from which theoretical inferences were drawn.

Method

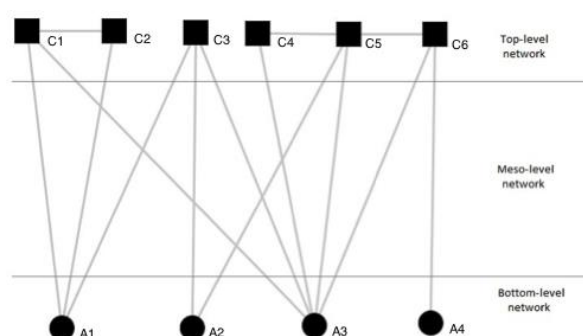
To extract findings from this case study it was crucial to select the appropriate method for the analysis. The aim of this study was to identify patterns of network configurations assembled from relationships between companies sharing directors and auditors with regard to reputation-based auditor selection. This case was selected to enable a better understanding of whether and how immaterial commodities govern social selection processes. With that focus, this study finds that social network analysis (SNA) is the most appropriate method for conducting an examination of the collected data, as it enables the identification of the structure and evolution of network patterns assembled around mutually interdependent social relationships.

According to Wassermann and Faust (1994:11) social network analysis is a quantitative-based method, which emerged as a combination of empirical, theoretical and mathematical aspects of social relations, when different disciplines struggled to make sense of their relational data. There are different techniques in the research methodology of social

network analysis, but technique selection is primarily driven by the nature of the observed network (one-mode, multiple, bipartite, multilevel, etc.) and boundaries predetermined by the researcher (Robins, 2015). So far, SNA has been widely used as a research method in fields such as sociology, psychology, business, organization, politics, etc. An advantage of this method is that it provides estimations on network statistics with regard to observed network patterns (configurations) and attributes, and the statistical results it produces represent estimations of how particular network configurations or observed attributes play a role in structuring the entire network. A particular advantage of this method is that it enables simultaneous estimation to be conducted over a range of selected network parameters, through which it is possible to identify interdependencies between individual observations. Importantly, the method does not conflict with the classical statistical methods, but rather adds to previous statistical approaches.

This study aims to simultaneously observe social processes existing between relationships among homogeneous (company to company) and heterogeneous (company to auditor) social actors. This network is thus most appropriately categorized as multilevel, since two types of relationships were observed between two types of actors. Although the network is configured as multilevel, relationships between homogeneous social actors have not been observed at both levels, so auditor-to-auditor relationships were excluded as no reputation effect was expected at the bottom level of the network.

Figure 1: Board interlocks and auditors - simplified visualization of the observed network



Note: In Figure 1 squares represent companies (C) and circles represent auditors (A) together with their respective IDs. The figure here is a simplification of the multilevel network analyzed in this paper. This study considers only top (company-to-company / interlock) and meso-level (company-to-auditor / mandatory audit) networks. Ties at both network levels are non-directional.

This study used recently developed exponential random graph models (ERGMs) for multilevel networks (Wang et al., 2013), which is a cutting-edge statistical model to produce the network statistics. The model will project the structure of network ties by using information on relationships between observed actors, supporting them with theoretically selected attributes to serve as predictors of ties. ERGM works as a pattern-recognition device, which was originally developed for examination of one-mode networks by Frank

and Strauss (1986) and Wasserman and Pattison (1996). ERGMs are concerned with explaining the patterns of ties in a social network (Lusher, Koskinen & Robins, 2013), and assume that stochastic processes generate relational ties between them, which fits the theoretical conceptualization of reputation. ERGMs assume that ties in networks emerge through two distinctive processes: (1) network self-organization - presence or absence of other ties, and (2) social selection - due to the attributes of social actor. This study focuses on the latter, and specifically on the association of exogenous attributes and propensity of tie formation (Lusher et al., 2013). One major example of such a process is the 'homophily' effect where ties tend to emerge between actors holding the same attribute (McPherson, Smith-Lovin, & Cook, 2001). ERGMs hold the premise that the overall network structure is comprised of small mechanisms that lead to tie formation processes. This study considers network statistics in order to capture those network patterns whose emergence is not likely to occur at random. The network parameters observed in this study fully correspond to theoretically conditioned relational mechanisms. Finally, I estimate network statistics by integrating both top and meso-level parameters into the single model, and develop network estimations for each observed year. These estimations will enable an understanding of the drivers of local structural patterns, while their occurrence is conditioned on the likelihood of observing the overall network (Robins, Pattison, Kalish, & Lusher, 2007).

4. Analysis of results

Sample description

Table 1 provides a summary of the descriptive statistics for the observed network models, and Table 3 reports the model estimations for network structural parameters and selected social actor attributes. It captures the most important properties of the two-mode interlock and auditor selection multilevel network for each of five observed years in order to identify the essence that is crucial for understanding the models. All networks are structurally different in regard to the number of companies (145 - 165), total numbers of board members (898 - 970) and auditors (161 - 189). Nevertheless, the presented ratios differ across observed network structures.

The densities of each network and in each year are below 1% (0.73% - 0.86%), which signifies low-density networks. That might be a consequence of regulation which determines the number mandatory engagements per year and number of partners per

engagement, which could be assembled between auditors and companies. Across the observed years the average number of supervisory board members was below 7 ($m = 6.54 - 6.86 / SD = 2.52 - 2.73$), which in comparison with the size of supervisory boards in other countries, such as the US, may be considered relatively small. The average number of interlocks per board ranges from 1.11 - 1.16 ($SD = 0.42 - 0.44$), which implies the stability of an interlock network across the time, and rarely more than one director that interlocks at one board of directors. Finally, on average 1.82 - 1.91 ($SD = 0.38 - 0.54$) audit partners were engaged per client per year, while each auditor had 1.63 - 1.75 ($SD = 1.08 - 1.17$) audit engagements per year.

Table 1
Sample description

	2010	2011	2012	2013	2014
Number of companies (clients)	165	162	153	149	145
Number of board members (Individuals / with overlaps)	970 (1086)	963 (1074)	922 (1026)	898 (1000)	899 (994)
Number of audit firms	13	12	10	10	10
Number of auditors (Individuals / with overlaps)	189 (315)	189 (310)	167 (290)	161 (282)	163 (265)
Ratio auditors to audit firms	14.54 (24.23)	15.75 (25.83)	16.7 (29)	16.1 (28.2)	16.3 (26.5)
Average number of members per board of directors (supervisory board)	$m=6.54$ $SD=2.62$	$m=6.63$ $SD=2.52$	$m=6.71$ $SD=2.61$	$m=6.71$ $SD=2.73$	$m=6.86$ $SD=2.61$
Average number of interlocks per board of directors (supervisory board)	$m=1.12$ $SD=0.42$	$m=1.16$ $SD=0.43$	$m=1.11$ $SD=0.44$	$m=1.11$ $SD=0.44$	$m=1.11$ $SD=0.43$
Average number of audit partners per company (client)	$m=1.91$ $SD=0.54$	$m=1.91$ $SD=0.46$	$m=1.89$ $SD=0.42$	$m=1.89$ $SD=0.48$	$m=1.82$ $SD=0.38$
Average number of audit engagements per auditor	$m=1.67$ $SD=1.13$	$m=1.64$ $SD=1.17$	$m=1.73$ $SD=1.23$	$m=1.75$ $SD=1.08$	$m=1.63$ $SD=1.17$
Total density of two-mode multilevel interaction network	0.73%	0.73%	0.84%	0.86%	0.82%


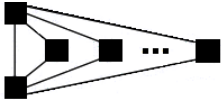
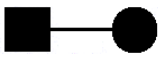
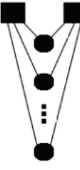
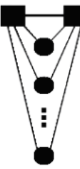

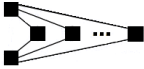


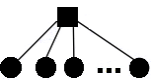
Note: m - mean; SD - standard deviation.

Model estimations

Table 3 provides estimations of the five respective models for each observed year, which are organized into three horizontal sections. The first and second sections represent statistics related to network structural effects. Specifically, they give estimations of parameters related to ties between companies sharing directors (one-mode) and companies selecting auditors (two-mode). The third section outlines estimations related to variables (reputation, net income and company size), which are integrated into the model together with network structural parameters that are theoretically determined. Attributes are further distinguished in two subsections in order to enable the transparency of both one-mode and two-mode network attribute effects. All models are discussed to provide an understanding of the interdependence between network structures and observed attributes.

Overall, model estimations reveal that observed network is characterized by the presence or the absence of a certain number of patterns. Significant patterns are those that are likely to occur more or less often than could be expected by chance. The presence and significance of attribute effects indicates the extent to which a particular attribute contributes to the network formation process. Despite the fact that findings are partially inconsistent across observations, a trend in regard to how the social selection process unfolds is identifiable across the network statistics. Table 2 presents the network patterns that were included in model estimations, which are derived based on previously delineated theoretical assumptions.

Table 2
Network patterns included in the models

Visualization	Parameter (MPNet)	Interpretation
	<i>Edge</i> - 1-mode network edge	Tie between two companies sharing a board member (Control effect)
	<i>ATA</i> - 1-mode network closure effect	Companies forming closure effect through ties of interlocks
	<i>XEdge</i> - 2-mode network edge	Tie between company and auditor (Control effect)
	<i>XACB</i> - 2-mode network clustering effect	Interlock has no impact on selection of the same auditor
	<i>ATXAX</i> - 2-mode network closure effect	Interlock has an impact on selection of the same auditor
Control effects		
	<i>Star2A</i> - 1-mode network	Companies tend to share a board member between two companies (Markov model effect)
	<i>A2PA</i> - 1-mode network	Companies forming clustering effect through ties of interlocks
	<i>XStar3B</i> - 2-mode network	Auditor tends to audit three clients (Markov model effect)
	<i>XASB</i> - 2-mode network	Auditor popularity effect
	<i>XASA</i> - 2-mode network	Company selecting more auditors

In the following, I provide with an overview of the results for each separate network, together with an overview of the entire period of observation to enable a dynamic approach.

Structuring principles of shared directorship network

The results of network parameter estimations related to the top-level network indicate that companies are likely to have a shared board member(s) in the structure of the supervisory boards (board of directors). In network terms, this implies that relational ties are likely to become established between companies through interlocking directorships. More specifically, the positive and significant statistics of the observed network parameter shows that the interlocking directorship network is rather structured according to a more complex rule than a single tie observation might reveal.

The focal network structuring parameter shows that relational ties between companies tend to create a strong closure effect, which is both positive and significant in all five models across the entire period. The significant parameter value indicates that an interlock network is characterized by the presence of small regions where two companies that share at least one board member are likely to share their board members with the same other companies, if more than one other interlock is established with more than one additional company. This implies that the emergence of interlocks with the same companies might be directly ascribed to an already existing interlock between two focal companies, where the interlock also affects the emergence of other interlocks.

The closure effect is an alternating triangle-like form network configuration where the number of triangles, interlocks with the same other companies, is rather flexible, and does not specify the direction, origin, which particular individual board member represents the interlock, or whether the common actor mediates multiple interlocks. It also reveals the path that board members tend to take when they structure a network of interlocks. The results here show that a closure effect is the main structuring principle, which might create a condition for the direct information flow between boards comprising the network. It is also possible to assume that, due to the information flow, companies that are structuring the closure might be engaged with similar decisions related to other possible relationships, such as auditor selection.

In three out of five observations, models were controlled by the *Markov* two-star effect in order to achieve model convergence, which represents the approach to network statistics at the common point. Good convergence is indicated by the t-ratios being close to zero. In all three cases negative and significant statistics were produced, and those results showed that companies, in general, are not likely to have exactly two interlock ties with other companies, which corresponds to the information on the average number of interlocks per board of directors (supervisory board) presented in Table 1. Those results correspond with the social circuit network parameter (closure), where the significance of a complex network structure requires more than two interlock ties to emerge from a single entity in order to form a particular configuration.

Table 3

Results of the exponential random graph models for selected years

Network level	Parameter		2010	2011	2012	2013	2014
			Estimate (S.E.)	Estimate (S.E.)	Estimate (S.E.)	Estimate (S.E.)	Estimate (S.E.)
Client-level: shared directorship networks	Tie between two companies sharing board member (<i>Edge</i>)		-5.5063* (0.219)	-5.7073* (0.203)	-3.4894* (0.35)	-5.477* (0.203)	-5.7107* (0.174)
	Companies forming closure effect through ties of interlocks (<i>ATA</i>)		1.6745* (0.106)	1.8902* (0.123)	0.2446* (0.119)	2.0368* (0.127)	1.7440* (0.109)
	Control	Companies forming clustering effect through ties of interlocks (<i>A2PA</i>)	-0.0378 (0.028)	-	-	-	-0,0497 (0,031)
		Companies tend to share board member with two companies (<i>Markov model effect</i>) (<i>Star2A</i>)	-	-0.0549* (0.025)	-0.1117* (0.045)	-0.0945* (0.036)	-
Auditor-client interaction network: Meso- level network	Tie between company and auditor (<i>XEdge</i>)		-3.8575* (0.376)	-7.2185* (1.24)	-4.3094* (0.37)	-7.1716 (3.859)	-6.4880* (1.010)
	Interlock has no impact on selection of the same auditor (<i>XACB</i>)		-0.4172* (0.19)	-0.2074 (0.226)	0.1453 (0.081)	0.6582* (0.252)	-0.2334* (0.089) ($\lambda = 6$)
	Interlock has an impact on selection of the same auditor (<i>ATXAX</i>)		0.0086 (0.023)	1.1727* (0.221)	-0.4127 (0.605)	0.7037 (0.444)	1.2593* (0.342)
	Control	Auditor popularity effect (<i>XASB</i>)	-	2.0162* (0.909)	-	-	-
		Companies selecting more auditors (<i>XASA</i>)	-	-	-	-	-7,5249* (0,843)
		Auditor tends to audit three clients (<i>XStar3B</i>)	-0.0461 (0.056)	-	-	-0.1103 (0.083)	-
Attributes at the shared directorship network	Reputation-based interlock effect		1.0594* (0.279)	1.0055* (0.277)	-0.2661 (0.978)	0.3443 (0.944)	0.1135 (1.088)
	Company size-based interlock effect		0.1189 (0.121)	0.0733 (0.102)	0.244 (0.172)	-0.0397 (0.042)	0.1454 (0.106)
	Financial result-based interlock effect		-0.0146 (0.063)	0.0321 (0.041)	-0.0247 (0.075)	0.064 (0.043)	0.0271 (0.051)
Attributes at meso- level network	Reputation-based selection of auditors		-0.5137* (0.221)	1.1265 (1.024)	0.4613 (0.348)	2.2883 (3.877)	0.449* (0.202)
Goodness of fit All <i>t</i> -statistics for each parameter at all selected years were below the threshold value of 0.1 and such indicates a good model fit (Robins et al., 2009; Wang et al., 2013)							

Notes: All reported coefficients are unstandardized. Z score was used only to convert client size and net-income values into a narrower span relative to their original values. Statistically significant effects were captured at or beyond 0.05 level. The value of $\lambda = 2$ has been used here as an initial value as it has been proven to be reasonable for many ERGMs estimations, however higher values, as indicated ($\lambda = 6$), contribute convergence in the case of highly skewed degree distributions (Koskinen & Daraganova, 2013; Robins et al., 2007). Omitted parameters at both network levels were excluded either because the model convergence could be reached without them or could not be, if otherwise.

The impact of company attributes on one-mode network social selection process

The second part of the analysis is driven by the assumption that social selection processes within social networks are conditioned by similarities in attributes that actors in the network hold. In this step I inspect the extent to which different attributes drive the homophily effect in relation to interlock emergence, taking into account a condition of attribute interdependence. For this purpose I integrated company size, total earnings (net income) and reputation scores for each company as main variables. The attributes of company size and net income are categorized as continuous, while reputation is predetermined as a binary variable. The aim of these attributes is to examine how the strength of similarities in particular characteristics determines the emergence of relational ties. The incorporation of all three attributes to network structural parameters allowed an examination of whether, and if so which, previously selected attributes surpass the others in terms of significance, and therefore might be described as the model's most influential attribute regarding tie emergence.

The results in all five estimations showed that similarity in company size and financial results have no significant effect on predetermining the interlock emergence when reputation is integrated in the model as a separate variable. The results indicate that interlocks tend not to emerge between companies that are similar in number of employees, which were used here as a proxy for company size, nor at the level of the bottom line result. Although the observed models demonstrated mainly positive network statistics, all previous attributes were insignificant, and thus the size and income-based homophily effects on interlock emergence tend to occur at random.

Model estimations, on the other hand, show that reputation scores might affect interlock emergence. Based on the estimations, in the first two models (2010 and 2011) the reputation-based homophily effect is both positive and significant, and reputation effect was either positive or negative, but insignificant in the following three models. Comparing those results to the network structuring parameters it could be inferred that a strong positive closure effect is present between reputable companies in years when reputation effect was significant, but as the closure effect is durable over time because decisions for establishing alliances are strategic, the diminished significance of reputation statistics might not be a sign of the reduced importance of reputation effect on alliance emergence, but rather a sign of diminished levels of reputation scores between companies making closures, which

further disturbs the effect of reputation-based homophily. Potentially reduced reputation scores between members of highly closed network areas might suggest the irrelevance of reputation for interlock emergence. However, this might require additional inspection of whether and how, on the other levels of the network, reputation effect might potentially be compromised or regained.

Structuring principles of auditor selection network

Continuing with presentation of estimated models, in one part of the observation it was estimated whether the selection of auditor can be determined by the presence of interlocks, and in particular, the selection of the same auditor. The effect of an interlock on auditor selection was examined by testing the two opposite network structuring principles, through which it was possible to identify the prevalent significance. In particular, whether the presence of an interlock has an impact on auditor selection or not. These two effects differ in regard to the presence or absence of a tie between companies (clients) in relation to the same auditor selection. The results of simultaneous inspection of the top-level and meso-level network showed that across the entire observed period, apart from 2012, interlocks had a positive and significant effect on selection of the same auditor. Although the 2012 model produced insignificant statistics, the positive parameter value shows that the tendency is present, but the insignificant statistics might be a result of changes in the structure of companies being listed at particular time. Overall, the results here imply that interlocks have a positive and significant impact on auditor selection, and this might be a result of previously discussed closure effect which implies that the transmission of information between boards of directors is established through interlocks.

Additional network structuring principles were included within several models to enable network convergence. They included auditor popularity effect, auditor tendencies to select three clients (which is a *Markov* 3-star effect) and company tendencies to select more auditors. Each of these network parameters was insignificant except the last, which was significant and negative, which was expected since regulatory requirements prevent companies from selecting an arbitrary number of auditors.

The impact of auditor reputation on client choice

Finally, to encompass the entire model estimations and reflect on the previously defined hypotheses, I report the following findings related to reputation in earlier discussions about findings of the observed models. The findings here prompt inconsistent but rather

interesting reflections on whether and how reputation plays a role in social selection processes.

Network statistics show that the impact of an auditor's reputation on client selection varies across models over the observed period. The first of five models shows negative and significant statistics for the reputation-driven selection of auditors, implying that the companies were less likely to select auditors with positive reputation scores, or who are considered reputable. In the following three models, the reputation statistics started gathering positive values, but were still insignificant, however, in the very last model the effect of reputation on auditor selection became positive and significant. Regardless of the fact that the model statistics gave cross-sectional estimations of network observations, it is clearly seen that there are tendencies for clients in this case to be prone to altering incentives for selecting reputable auditors.

Overall, the effect of the changed and increased significance of auditor reputation scores on the client selection process could be directly related to the emergence of a reputation-based interlock. Considering two reputation based social selection processes, homophily for interlock emergence and the selection of an auditor, it is possible to identify an interplay in which a single attribute type is produced between two network levels, and finally to identify cross-level reflections on relational tie emergence. In models where the reputation-based interlock effect was positive and significant, the effect of reputation-based selection of the auditor was negative and significant or either insignificant. This could be interpreted as meaning that companies might not be interested in selecting reputable auditors when they have established ties with reputable companies through interlocks, or in other words, when interlock cluster representatives hold similar reputation levels. The finding here supports the assumption that in the latter models, when the reputation effect between companies became insignificant, reputation-based effect on the selection of auditor was the opposite, positive and significant. It might seem that the ease of auditor reselection and a change towards those that are reputable might be used as the tool to compensate for the lack of reputation effect at the company level network, because interlock alliance formation is relatively more durable and hard to disrupt.

It is possible to confirm that reputation, in general, has an important and significant role in social selection processes within actors of the same, and between actors of different, types. More specifically, auditor reputation plays an important role in the selection process

of clients, but only when diminished reputation scores disturb the reputation effect at the interlock level. Acknowledging this, it could be argued that both hypotheses, *H1* and *H2*, have been proved.

Goodness of fit analyses

As recommended by Robins et al., (2009) and Wang et al., (2013), each model presented has been tested for goodness of fit. *T*-values have been estimated for all available network configurations, and estimates for observed network parameters were below 0.1, and below 2 in absolute values for all the other network configurations, suggesting reliable results.

5. Discussion

In agreement with two streams of literature that an immaterial commodity such as reputation might have a significant effect on social selection processes in the contexts of interlocking directorships (Galaskiewicz et al., 1985) and auditor selection (Magri & Baldacchino, 2004), the study here examined whether and how reputation mutually negotiates between the two contexts. Although the literature only hypothesized an impact of reputation on social tie emergence, a separate examination of those two contexts would result in limited understanding of the reputation effect in an audit context. Arguing that reputation might negotiate between two social selection processes, reputation-driven tension prompted an investigation of how such interdependence drives the interplay of social selection processes. To jointly examine the effect of reputation on relation emergence, I utilized exponential random graph models (Wang et al. 2013) to quantify the interdependence and identify the mutual impact of two separate, but arguably contingent, reputation-driven tendencies. This was done through an examination of relational ties and the network configurations that they have formed across five separate models that were captured across the observed period. The results of the analysis suggest that reputation has a significant effect on the emergence of both interlocks and auditor selection, but the emergence of relationships is causal and reputation effect is compensatory.

Initially, this study confirmed that interlocks impact auditor selection (Davison et al., 1984; Johansen & Pettersson, 2013), but also that Danish interlocks have a strong tendency to form complex, closure-like network configurations, which might enable

information flow and managing decisions across the alliances. In respect to other studies on strategies for establishing interlocking directorships (Mizruchi & Stearns, 1988; Stokman, Ziegler, & Scott, 1985; Pfeffer & Salanc, 1978; Useem, 1982) and reasons for auditor selection and change (Beattie & Fearnley, 1995; Magri & Baldacchino, 2004; Woo & Koh, 2001), the findings showed that, in both contexts, relationships tend to either exist between those that are reputable, or to emerge towards those that are reputable. The social selection process is characteristic of network studies, as ties between homogeneous actors exist and emerge through the homophily effect, and the results here demonstrate that no material elements drove the effect of emergence, while the reputation, as an immaterial element, did. Not all models showed that reputation had a significant effect on interlock emergence, however, the results here challenged the argument of Gu and Lu (2014) who claimed that in a lack of homophily it is hard to establish proximity with the others social actors. Their argument is questionable due to the durability of interlock ties, which implies that the actors involved in social networks might experience changes in attributes over time. In this regard, the diminished significance of reputation, which is a result of changed reputation scores between companies forming closures, does not result in redistribution of ties representing interlocking directorships towards those that were re-evaluated as reputable, but rather keeps them stable despite the unequal distribution of reputation scores.

The duration of interlock alliances and investigation of homophily effects to determine the relevance of reputation by inspecting only the network of interlocks, would bring concern about whether reputation has durability in terms of significance, or is rather random since it depends on current evaluation scores. An inspection of how a level of auditor reputation becomes relevant to companies when closure effects do not sustain homophily effect between those that assemble closure becomes a crucial part of the investigation. Results revealed the existence of an alternative mechanism that companies undergo in order to compensate for an imbalance at the homogeneous actor level of the network. This mechanism of compensation brought complexity to strategies for establishing ties, in this case, with auditors. This indicated that a deficit of reputation-based homophily drives changes of relationships between companies and auditors, particularly those that are also carriers of the focal attribute, but at the other network level. Divergences in durations of interlock-based alliances and client engagement with auditors enables companies to use auditor reputation as a temporary mechanism to compensate for the current lack of reputation-based homophily. This study further extends the argument of Gu

and Lu (2014) and Galaskiewicz et al. (1985), as it touches upon how companies deal with the issue of unequal distribution of reputation in order to protect their social position from being perceived as either disreputable, or being connected with those that are disreputable.

This study also gives an indication that social actors might find that their relationships with other social actors may contribute to the social perception of themselves, as they tend to navigate through relationships in order to eliminate the negative effects that more durable relationships (interlocks) might bring. This offers a rationale for discussing the results of reputation networks from the perspective of identity theory, as social environments are comprised of stratified social groups, and social actors might use such mechanisms to signify their identification through others, which might enhance their social standing. Reflecting on identity theory, it is notable that board members, in fact, use reputation as a strategy for identification, since they tend to establish relationships with those that are reputable if they are perceived as reputable, as well. Put differently, companies establish relationships with heterogeneous social actors to compensate for an imbalance in reputation between the homogeneous group, which they use as a tool for re-identification.

Giving empirical context to the theoretical categorization of social processes in alignment with identity theory, the case here reveals that two strategies are characteristic of this context. In fact, two processes resemble the strategies of social creativity and individual mobility (Tajfel & Turner, 1979) as they give complementary perspectives on scenarios that social actors tend to pursue at the multilevel network level. The strategy of social creativity enables network participants to seek positive distinctiveness through an alternation of criteria for comparison, while the mobility strategy enables them to make movements towards higher-status groups. More specifically, companies, while still holding interlocks, tend to seek an alternative source of comparison in order to enhance their own social standing. This means that the social creativity strategy enables companies (clients) to locate the source of reputation to alternative groups of social actors, because the ability to manipulate relational ties enables them to react promptly to reputation imbalance by switching to reputable auditors. This means that, at the level of homogeneous networks, companies use social creativity strategy to distinguish themselves from the group, and there is no change in interlock structure, however, at the heterogeneous level, companies tend to switch to reputable auditors by using this as a mechanism to improve previous standing in the group to which they belong.

Conclusion

The paper here addressed the research question: *How does reputation impact the social selection process in an auditing context?*

The objective of this study was to consider two assumptions on reputation in the context of the interlock-based selection of auditors, to investigate whether and under what conditions reputation creates interplay between two social selection processes. The investigation was conducted by application of exponential random graph models, and the findings of the study have extended what we know from the literature about the impact of interlocking directorships on auditor selection.

The results of the study outline that, within the interlocking directorship network, companies tend to form closure-like strategic network configurations between reputable companies. More importantly, when the level of reputation becomes unequal among the members assembling closures, companies tend to use the opportunity to establish relationships with reputable auditors, which previously had not been considered. The study revealed that actual relationships and the reputation of those with whom companies form relationships, play significant roles in how social actors imagine themselves to be perceived by others. In other words, the reputation-based social selection model produces dynamics in the structure of the multilevel network ties between homogeneous and heterogeneous social actors. It is thus possible to conclude that companies tend to use auditor reputation as a tool to compensate for a lack of balance at the level of reputation, experienced through those with who they interlock, and enhance their perception in the eyes of others.

By pointing out how reputation reveals the interplay of relationships between interlocks and auditors, this study contributes to the existing literature on auditor selection and change. In fact, it responds to the call for research into the demand mechanism of auditor selection based on reputation (Johansen & Pettersson, 2013), and therefore adopts a relational perspective to estimating network statistics by involving two types of social actors that are interrelated by two types of relational ties, which were used here as the unit of the analysis. In this regard, this study investigated the interdependencies between several observed multilevel network configurations over five consecutive years within an auditing context, where individual mobility and social creativity together characterized patterns of the evolution of the reputation network. Finally, this study used identity theory to discuss

the results, which led to a discussion of how we might understand the observed network patterns, and simultaneously how these two theoretical perspectives could be used to discuss the results of multilevel networks structures.

Nevertheless, this study is not free of limitations. On the one hand, even though the sample comprised the entire population of companies listed on the Nasdaq OMX, subsidiary Copenhagen, at the particular time of each consecutive year observed, the results are only country specific and a wider geographical extent of the analysis would be welcome. On the other hand, this study provided insights into network patterns and network tendencies over time, and it would be worth investigating the perceptions of board members, both those that interlock and those that do not, and auditors from both Big/non-Big 4 companies, and intersect their arguments against the previous results. Finally, this study was limited to the extent that reputation re-gain was not observed, but which could be overcome through the integration of a larger number of models.

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List of publications

Other publications during the Ph.D. process:

Kacanski S., Tomasevic, S., Vlaovic-Begovic, S. (2014) Interim Financial Reporting in Function of Proper Decision Making. Skola Biznisa 1/2014. pp. 52-68