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Title of thesis

An empirical analysis of top management team strategic

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and their implications for corporate risk and performance

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By

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Abstract

The events of the global financial crisis have hastened the refinement of existing corporate governance regulations and the development of new ones to strengthen corporate governance mechanisms. However, critics of this approach argue that strengthening the corporate governance system by itself cannot guarantee better organizational outcomes. Rather, understanding the cognitive footprints of the top management team (top management strategic cognition) and its implications on organizational outcomes represent a better alternative. Currently, empirical research that examines the effects of top management team (TMT) strategic cognition on firm outcomes is scarce and sparse. Therefore, our knowledge and understanding of how TMT cognitive structures (mental models) influence organizational outcomes is limited and scattered. This study uses a sample of balanced panel data from 311 UK FTSE companies from 2007 to 2016 to examine the effects of TMT strategic cognition on organizational outcomes. Since TMT members differ in their cognitive structures, both researchers and policy makers find it difficult to identify specific cognitive elements that can secure optimum organizational outcomes. The motivation for this thesis is to contribute to the corporate governance literature by presenting a unique decision making framework that examines six different top management strategic cognition pathways and how the elements in each pathway influences firm outcomes. This thesis uses the partial least squares- structural equation modelling (PLS-SEM) and fixed effects estimation methods. The findings based on this thesis provide three original contributions to the literature. First, the results show that a TMT strategic cognition that combines innovativeness and high risk preference can secure better organizational outcomes. Second, the analyses further show that firms that have experienced accounting and finance experts and communicate more about their corporate sustainability to their stakeholders perform better in both crisis periods and stable periods. Third, a bankruptcy model that combines managerial attributes, accounting data and market data can provide a better prediction of a firm's bankruptcy probability and the variability in its market returns.

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CHAPTER 1   **Introduction**

The 2007/8 financial crisis damaged stakeholders' trust in the corporate financial reporting system (Alderman 2012). After the crisis, several policy initiatives were put in place by governments, regulatory bodies, institutions etc. to address the loopholes in the accounting and financial reporting system. These initiatives were also meant to restore confidence between organisations, firms and providers of financial capital. Previous studies posit that to restore stakeholders' trust, users of accounting information (especially providers of financial capital) mostly demand a more useful, detailed and coherent financial reporting system that can communicate "trust" and respond to their legitimate needs and interests (Freeman 2004; Jensen 2017). Further, the social and environmental effects of companies' economic activities should be communicated to stakeholders in a comprehensive format. An integrated report provides an elaborate communication tool about how to develop an organisation's strategy, governance, performance and prospects in a way that reflects the commercial, social and environmental context within which the organisation operates (Higgins et al. 2014; Flower 2015). Thus, integrated reporting (IR) provides a clear and concise view about how organisations create and sustain value as well as account for their stewardship (Higgins et al. 2014; Flower 2015). In contrast to a sustainability report, an integrated report is future-oriented compared to the traditional financial reporting system, which is historical-oriented. IR therefore seeks to capture the interconnectedness between the non-financial and financial drivers of organisational performance (Higgins et al. 2014; Flower 2015). IR advocates for a revolutionary shift in the way managers think about strategy and value creation. Advocates of IR argue that future growth, value creation and organisational sustainability can be achieved through integrated thinking at all levels of management, especially at the TMT level (Higgins et al. 2014). In furtherance to this argument, Kaplan (2011) argues that because value is created by shared cognition among

the TMT over different periods of time, integrated thinking among the TMT should be promoted across all organisations. The ability of an organisation to create value and respond to environmental challenges is pivotal to its viability and sustainability (Helfat 2015). The upper echelon theory has been quoted by the extant corporate governance literature in varied contexts to support how TMTs drive firms' value creation processes (Hambrick 1984; 2007; 2014). For example, according to Hambrick (2014), it is the TMT that determines the strategic directions of organisations, identifies opportunities and risks, interprets relevant information, determines organisational constraints and capabilities, allocates resources, and formulates strategic policies for organisational value creation etc. Further, it is the responsibility of the TMT to provide accountability of their stewardship by promoting trust and confidence in the financial reporting process (Helfat 2015; Hamori et al. 2015, Herrmann 2014; Kor 2008).

Integrated reporting and TMT cognition are gaining popularity in the accounting, accountability and finance literature as a result of increasing demand by stakeholders for organisations to justify their value creation prepositions (IIRC 2013; Cheng et al. 2014; Flower 2015). The emerging research on integrated reporting and TMT cognition has made two related moves regarding value creation preposition (Ensley and Pearce 2001). First, both address the question of the organisational response to their environments. TMT cognition researchers suggest that the organisational environment is not purely exogenous; therefore, to achieve higher organisational outcomes, TMT cognition should reflect the organisational environment and competition (IIRC 2013; Cheng et al. 2014; Flower 2015). To achieve this, TMTs develop experiential learning about their environment through a combination of education and experience. In this chapter, I explain how TMT education and experience can influence their strategic cognition and value creation. Similarly, IR researchers argue that the ability of an organisation to create value for itself is linked to its environmental relationship (Porter and Miller 1989; IIRC 2013;

Cheng et al. 2014; Flower 2015). Thus, organisations that respect and create value for others (stakeholders) and their environment are more sustainable, and vice versa (IIRC 2013; Cheng et al. 2014; Flower 2015). Second, both cognitive researchers and IR researchers agreed that organisational resources and infrastructure in itself cannot create value. Rather, it is the organisational TMT that drives value creation through the effective and efficient appropriation of organisational resources. For example, Simsek (2005) posits that structural features such as organisational policies, culture, routines etc. are only effective when they are backed by "better brains". To support this argument, Carpenter et al. (2004), reaffirm that organisational outcomes partially reflect TMT cognition, which is influenced in turn by their level of education and experience. Kaplan (2011) on the other hand argues that organisational value creation's "foot prints" can be traced through TMT mental maps. No study has examined IR from the perspective of TMT cognition. The previous literature has examined IR from different perspectives, including environmental sustainability (IIRC 2013; Cheng et al. 2014; Flower 2015), organisational capital and value creation (Flower 2015), and social/relational capital and value creation (IIRC 2013). However, our understanding of integrated thinking (TMT cognition that drives organisational capital to create value) is limited and scattered.

Effect of integrated report on TMT strategic cognition

IR has the potential to shift TMT strategic cognition (strategic thinking) from the profit maximisation notion to social and environment sustainability (Adams 2014). Integrated reporting (IR) emphasises long-term cognition and encourages a broader thinking perspective about the corporate value creation process and the business model (IIRC 2023; Adams 2014). Corporate information disclosure, either voluntary or mandatory, has been used by most firms in order to mitigate agency cost and to reduce information asymmetries (Flower 2015; Aceituno et al. 2013). Stakeholder rights to demand

transparency, fairness, social justice and corporate accountability from mangers about their stewardship have been strengthened since the recent financial crisis. Further increase in competition (Flower 2015; Aceituno et al. 2013), technological changes (IIRC 2013; Cheng et al, 2014; Flower 2015) and the increasing complexities in the way organisations operate nowadays have all exacerbated the already complex financial reporting process (Aceituno et al. 2013). TMTs are not only responsible for safeguarding the assets of the company, they also serve as custodians of stakeholder interest (Helfat 2015; Hambrick 2015; Aceituno et al. 2013). It is the responsibility of TMTs to communicate to provide accountability of their stewardship to the owners and other stakeholders of the company. Moreover, the decision to implement IR is determined by the TMT (Adams 2014). It is clearly discernible from the above arguments that the TMT's role in the acceptance and the implementation of IR cannot be underestimated. The IIRC (2013) framework provides key guidelines that enable TMTs to provide information about the organisation's governance structure and how it supports the organisation's value creation process in the short, medium and long terms (IIRC 2013). Adams (2014) argues that to achieve higher organisational outcomes and corporate sustainability, TMT has to factor into their strategic cognition the following: the type of business model that can maximise organisational goals, how they create value and to whom, and an exploration of available opportunity and risk etc. IR provides TMTs with the opportunity to inform stakeholders about the strategic ambitions of the organisations, specific processes that support the actualisation of the organisational strategies, resource allocation plans and implementation processes, the social and environmental effects of the organisational value creation processes, how TMTs will measure achievements and targets outcomes for the short, medium and long terms etc. (IIRC 2013). The IIRC (2013) provides information about the key elements and the general reporting guidelines that should be followed by the TMT. This includes (a) disclosure of material matters that can influence the

organisational value creation process; (b) disclosure about the firm's capital, namely human capital, social and relational capital, financial capital, intellectual capital, social and relational capital etc.; and (c) information contained in the IR should include an organisational overview, the external environment, governance, business model, risk and opportunities, organisational performance, the basis for the preparation and presentation etc.

Structure of the thesis

This thesis is organised into five main chapters. Chapter one provides a conceptual overview of IR, how it influences TMT strategic cognition and the reconfigurations of organisational capitals into four key capitals, which includes people, process, relational capital and risk. Chapter two focuses on IR value creation preposition from the perspective of TMT as the major organisational capital that influences all other capitals mentioned in IR. The main focus of chapter two is to provide a conceptual and empirical examination of how TMT mental maps influence organisational value creation prepositions. Moreover, chapter two provides a detailed conceptual analysis of the six dominant cognition pathways that can be used by TMTs at different times to create value. One of the key principles of IR is to provide concise but adequate and reliable information about the organisational value creation propensities to stakeholders (IIRC 2013; Cheng et al. 2014; Flower 2015). To achieve this objective, organisations require effective audit committees that can monitor their internal control systems as well as the financial reporting processes (IIRC 2013; Cheng et al. 2014; Flower 2015). Against the backdrop of the above, chapter three provides a conceptual and empirical analysis on the effects of audit committee attributes on organisational value creation, both during crisis periods and periods of stability. The key objective of chapter three is to identify the dominant audit committee attribute that can secure the highest organisational outcome during crisis and

stable periods. Moreover, chapter three outlines detailed conceptual issues including audit committee and financial reporting quality (financial reporting quality is measured by modified Jones earnings management), the causes and effects of the 2007/8 financial crisis, fraud triangle theories and the six dominant positions that fraudsters use in committing fraud etc. Chapter four provides empirical examinations of the effects of different bankruptcy risk models on firm performance. Chapter five provides a summary conclusion of all the chapters as well as the application of each chapter.

1.1   Motivation to the study

The global financial crisis and continuous damage to our planet's natural capital implies inadequacy of contemporary accounting information in meeting the challenges of the 21st century. The essence of accounting information is to provide trust and confidence in transactions and exchange. However, the global financial crisis (GFC) has damaged investors' confidence and trust in the financial reporting process. The key causes of GFC include poor accounting practices, fraud, poor governance and accountability and poor financial reporting systems. The role of integrated reporting (IR) is to improve accountability and provide more comprehensive integrated information about the full impact of the firm's capital on its performance. However, critics of IR argue that most CEOs and top management team (TMT) visualise corporate reputation enhancement as a key motive behind integrated reporting (Steyn, 2014). Some corporate governance schoolers argue that, perceived corporate legitimising effect of producing an integrated report is conditioned by TMT's strategic orientations and preferences (example Cheng et al. 2014 and Flower 2015).

According to the above critics, IR is deficient in addressing three major questions; first the definition of what constitutes capital in firms is subjective and ambiguous in IIRC

2013 framework. Second the IIRC 2013 framework failed to relate identified the effects TMT as the most important corporate assets. Third, there was no clarity regarding the effects of TMT attributes on firm value creation prepositions in the IIRC 2013 framework. Fourth key corporate governance issues such as financial reporting quality, corporate sustainability and risk were given less priority in the IR framework (Cheng et al., 2014b; Flower, 2015). This study aims at addressing these problems as well as synthesises awareness from accounting, auditing and corporate governance research into the briskly emerging field of integrated reporting. This study aims at addressing the key challenges facing the implementations of IR by increasing our understanding about the effects of TMTs on firm's value creation prepositions. Further, this study provides a unique perspective to the IIRC framework 2013. First the study examine the problems associated with the factors that influence firms' capital from the perspective of TMT strategic cognition and effects on firm value. Second, this study address the problem of financial reporting quality (earnings management) and its effects on firm value creation from the perspective of audit committee attributes. Third, the study examine corporate risk (a key element of IR) and corporate sustainability issues from TMT perspective. This study therefore aims at providing academics, policy makers and regulators a different perception about the IIRC from the perspective of TMT attributes and firm outcomes, audit committee effectiveness and firms' outcomes and corporate risk probabilities.

The IIRC, among others, emphasises two key issues, thus integrated thinking and integrated reporting. The integrating thinking aspect requires firms to be more creative and productive. The integrated report on the other hand requires firms to enhance accountability and stewardship about how firms create value. Previous studies on integrated reporting have either criticised the IR concept or just commented about the challenges facing its implementation. For example, according to Flower (2015), IIRC failed to address several major concern about value creation which include; definition of

what constitutes capital, trade-offs of capitals, the abandonment of societal sustainability and social capital issues in the entire framework, the inability of the framework to emphasise the relevance of financial integrity which can be achieved through audit committee effectiveness and the inability to address issues relating to legal barriers that can impinge on the implementation of the IIRC (2013) framework in specific countries (Cheng et al., 2014b; Flower, 2015). For example, regarding the definition of capitals, IIRC (2013) only provided 'one size' fit all categories of capital in the framework with little or no justifications for including them in the framework. Different companies use different stock of capitals to create value, therefore lack of clarity about what constitutes capital can cause inconsistencies (Flower, 2015) Further, the IIRC accepts that it is appropriate for a non-performing category of capital to be compensated by a well performing capitals (Flower, 2015). This implies that companies can just include as many capitals in their capital stock irrespective to their added value to the value creation process. I contribute to this discourse by examining the key capitals (i.e., TMT's and AC) in most listed companies and how they contribute to corporate financial performance and firm value. Further, I provide empirical evidence of managerial attributes, accounting information and stock market information that affect financial health and corporate risk. Another setback of the IIRC is that it does not require firms to report on the impact of their activities on stakeholders, society and the environment (Flower, 2015). In most cases sustainability is used in relation to the firm and its operations rather than the environment, community and the society. This implies a shift of corporate social responsibility which further increases the risk of companies (Flower, 2015). Further, little or no mention was made about corporate risk which is a key issue regarding corporate sustainability.

This thesis addresses the above problems by focusing on the three key components of most business which include people, process and risk. First, I examine TMT attributes and firm outcomes, second I examine financial reporting process from the perspective of

earnings management and AC effects on financial health and firm value. Third, I examine the combined effects of TMT attributes and accounting data on stock market returns volatility and corporate financial health. The two key pillars of the IIRC (2013) framework includes integrated thinking and value creation. Chapter two of this study examine integrated thinking in the IIRC framework from the perspective of TMT strategic cognition and TMT dynamic capabilities. In addition, I examine in details the dynamic strategy configurations and TMT strategic cognition elements that can create value to firms in short, medium and long term. I argue that the TMT's constitute the 'brain house' of every firm. Also, the eight key component of IR that include governance, business model, strategy, risk and opportunity and financial reporting process are all conditioned by the TMT. This study is the first that examines integrated thinking from the perspective of TMT strategic cognition. Chapter three of this study examine the causes of the GFC from the perspective of audit committee (AC) effectiveness. I argue that audit committee is one of the key elements of the corporate governance system that is charges with the responsivity to oversee and monitors the financial reporting process. Integrated reporting can only be effective if the audit committee is effective. I contribute to the IR literature by examining the effectiveness of AC from the perspective of during and post GFC. Chapter four of this study examine the combined effects of managerial attributes, accounting data and stock market data on bankruptcy risk probabilities. Risk constitutes the unavoidable threat to all businesses. Bankruptcy risk particularly is the worst 'nightmare' of every business. Even though the IIRC (2013) framework mentioned the need for firms to report on risk and opportunity, detailed studies about what constitute risk are helpful. The third chapter of this study therefore examines key factors that can predict corporate risk.

1.2   Antecedents of integrated reporting

The last decades have witnessed a surge in corporate governance literature regarding issues related to managerial accountability (Villiers *et al* 2014; Cheng *et al* 2014), corporate sustainability (Villiers *et al* 2014; IIRC 2013) organisational relationship with their environment (IIRC 2013; Flower 2015; Cheng *et al* 2014), financial reporting integrity and trust issues (Flower 2015; Rodgers 2013 etc.). For example, the 2007/8 financial crisis provide a vivid evidence about the failures of the traditional financial reporting system which is predominantly historical oriented (Villiers *et al* 2014; Flower 2015). Previous studies show that, reporting financial transactions on accrual basis has resulted to higher discretionary accruals and earnings management. Further, studies show that both principle based and rule based accounting jurisdictions have failed to provide stakeholders enough information about the future strategic outlook of the and sustainable value creation prepositions of the organisation (IIRC 2013). The term social and environmental disclosure in the traditional financial reporting framework is contested by critics that claim that, the term 'sustainable disclosure' is used as 'marketing tool' to win the trust of stakeholders (Villiers *et al* 2014; Cheng *et al* 2014). Much social and environmental reporting in the traditional financial statement reports were scanty and less informative (IIRC 2013). For example in the traditional financial reporting framework, most managers carefully select social and environment reports that will only put their organisations in a better light.

1.3   Traditional accounting report compared with integrated report

There has been increasing concern about the inadequacy of the traditional financial accounting reports in meeting the decision making needs of verities of stakeholders (Adams & Simnett, 2011; Chen et al., 2011; Adams, 2015). Also, most stakeholders have lost trust in the traditional financial reporting system because of the recent global financial

crisis (Low et al., 2008; Acharya & Richardson, 2009; O'Sullivan & Kennedy, 2010; Christopoulos et al., 2011; Soltani, 2014; Bhasin, 2015; 2016). In the aftermath of the global financial crisis and corporate scandals, most stakeholders perceived the traditional financial reporting system as a mere economic rhetoric that enables directors to keep their job at the expense of investors and the entire community (Busco et al., 2013). The community still suffers from persistent fraud and unethical behaviours from business executives. Most critics believe that the notion of capitalism and the ultimate purpose of accounting is to promote a society where value is created for few aristocrats by using our limited social resources (Busco et al., 2013; Adams, 2015). Issues such as huge unemployment, zero hours contract in the UK, huge personal debt, environmental degradation, pollution and waste disposal problems have left contemporary society and government frustrated and powerless. In response to this, both regulators and decision makers have attempted to improve the quality and adequacy of information available for stakeholders decision making by supplementing their traditional financial reporting with environmental, governance and sustainability reports (ESG) (Cohen et al., 2012; Khan et al., 2013; Milne & Gray, 2013; Peters & Romi, 2014). Whiles the benefits of ESG information have been embraced by researchers (Du et al., 2010; Delmas et al., 2013; Mason & Simmons, 2014; Peters & Romi, 2014), and practitioners (Michelon et al., 2015; Tschopp & Huefner, 2015) to be of valuable relevance to stakeholders decision making (Du et al., 2010; Cohen et al., 2012; Mason & Simmons, 2014), the extent of the ESG and other non-financial report have led to information overload for stakeholders decision making (Gray et al., 1995; Epstein, 2007). Further, most of these reports refused to address the major concern of stakeholders that is sustainability issues (Adams & Simnett, 2011; Chen et al., 2011; Adams, 2015).

In response to the above problems the international integrated reporting council[1] (IIRC) was formally inaugurated on August 2010 to provide companies with a reporting framework that will enable companies to prepare various reports. At the inauguration of the IIRC the governing body issued a joint press release that set out the motivation for creating the IIRC. The press release was captured by Prince Charles (Prince of Wales) idealism which implies that 'Accounting is the major tool to save our planet'. In his inaugural speech the Prince of Wales posit that

"Our world has never encountered greater challenges: over-consumption of limited natural resources, climate change, and the need to provide food, clean water and a better standard of living for our growing global population. Decisions taken in tackling these issues need to be based on clear and comprehensive information"

Further in his opening address the chairman of the IIRC stated that;

However, presently we are struggling to meet the challenges of 21st century with 20th century financial reporting systems. The IIRC's responsibility is to craft a globally accepted framework for accounting for sustainability. In order to help with the development of more comprehensible and comprehensive information about organization's total performance and future prospects to meet the needs of the emerging, more sustainable, global economic model''.

Over the last five years the IIRC has made some significant progress in developing a framework for IR. In September 2011 the IIRC produced a discussion paper entitled " Towards integrated reporting – communicating value in the 21st century" (Committee, 2011) to receive feedback on the their IR concept. After due consideration to the feedback

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[1] The IIRC is made up of 40 high-profile-experienced members in the governing body. The 40 members were the heads of IASB, FASB, IFAC, ACCA, CFA, IOSC and the CEO's of the big four, CEOs of multinational corporations etc. The IIRC is dominated by professionals from the accountancy professions with qualifications in ACCA, CPA, CIMA and CFA.

received from stakeholders a consultative draft (CD) of the IR was released in April 2013. The main focus of the IR is to provide a framework that enables firms to communicate their short term, medium term and long term value creation propositions to their stakeholders. According to IIRC (2013) IR is a framework that provides "a concise communication about how a company's strategy, performance, governance and prospects in the perspective its external environment, results to value creation over short, medium and long term". This implies that the IR framework provide companies an 'exhibition platform' to showcase or communicate their value creation resources to stakeholders. These resources include its business model, products, financial, human capital, intellectual capital (IC), social and relational capital. A number of countries around the world have embraced IR. For example in South Africa, it is a requirement for all listed companies to produce IR. Further, studies show that significant number of stock exchanges around the globe have implemented the IIRC report or are in the process of its implementation (Cheng et al., 2014b). Further, in April 2013, the European Union commission announced a proposal to change the fourth and seventh accounting directives to promote more disclosure in the financial report. Also, a group known as the IIRC Business network from over twenty countries have voluntarily engaged with the IIRC pilot program to test the IR framework.

1.3.1 The six key elements in the IR framework

In the IR framework, the key 'value creation' driver of businesses is their capitals or inputs and the business model (Cheng et al., 2014b). It is therefore the responsibility of the decision maker (**People**) to ensure that these capitals are well managed with minimal **risk**, efficiently allocated, proactively transformed (**process**), and well accounted for to all stakeholders order to ensure value creation for their stakeholders. The framework identifies six key capitals that companies have to include in their IR. Below is a table showing the six capitals in the IIRC framework and their relationship to my framework.

Table 1. 1 the six key capitals linked to trust positions

IIRC (2013) Six capital Framework	People, Process, Risk framework	Trust Position
Financial resources	Process & Risk	Trust based on self interest
Manufactured Resources	Process & Risk	Trust based on Rules
Intellectual Resources	People	Trust based on ability
Human capital	People	Trust based on experience ability and integrity
Social and Relationship	People & Network	Trust based on relationship
Manufactured	People	Trust based on benevolence
Natural resources	Risk/Sustainability	Trust based on rules and ethics

(Source; Adopted from the IIRC 2013 framework)

One major contribution to integrated reporting by this study is the reclassification of the concept of the six capitals into three main category of capitals for firms. These are; people, process and social capital. First, I represent TMT with people because top echelon theory implies that corporate outcomes is a reflection of TMT demographic attributes. It is TMT that controls all capital in most firms. Second financial resources, manufactures resources and natural resources are conditioned by the type of business model or processes of the organisation. The financial reporting process provide a snapshot information about the organisational activities and processes. Therefore selected audit committee as a key corporate governance capital responsible for overseeing and monitoring of the financial reporting processes. The most important assets (capitals) in most firms includes people, processes and social relations. Therefore this study provides a unique perspective to firm value creation preposition by providing empirical evidence that support this view point. Figure 1.0 below illustrates corporate value creation cycle by the key capitals in organisations.
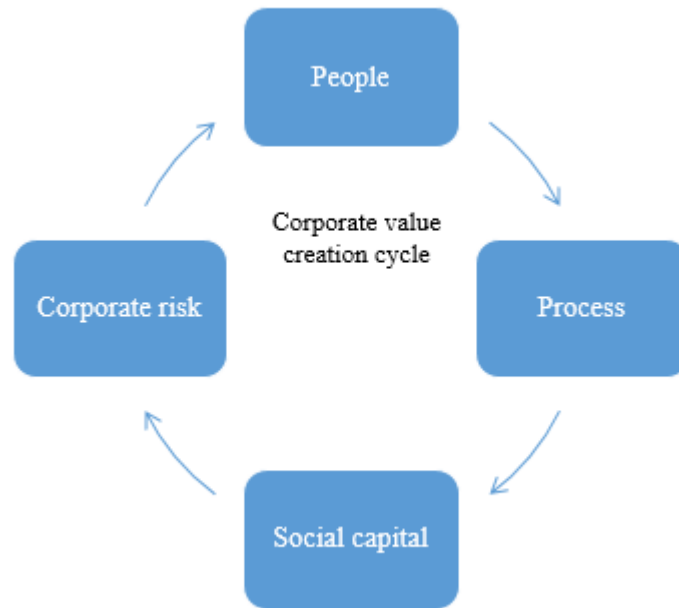
Figure 1.0 People process and Risk framework-value creation cycle

(Source: authors own construction adopted from IIR framework 2013)

1.3.2 Contribution to the IR literature

This study attempt to contribute to the solution of the IR implementation problems by highlight the three key capitals in most firm which are people, process and relationship (social capital) I argue that the six capitals in the IIRC (2013) framework in table 1.1 above is confusing and can ultimately hinder IR implementation. Further, categorising capitals into People[2] process[3] and social capital[4] will ensure easier implementation of IR as well as enhancing comparability of IR from different geographical and institutional background. Previous studies on IR have looked at IR from; corporate sustainability

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[2] **People** in this study comprises with the human capital especially the unique TMT dynamic attributes (the strategic cognitive base of the firm) that determines the capital requirements of firms and influence organisational outcomes (Hambrick & Mason, 1984).

[3] **Process** in this study involves; the flow of accounting and financial information, policies and procedures that guide the transformation (product/services) processes etc. The audit committee is play a pivotal role in monitoring and overseeing the firm's accounting, financial and transformation processes (DeZoort et al., 2002; Klein, 2002; DeFond et al., 2005).

[4] **Social Capital** in this study refers to the social resources including the network structures that can enhance firm's outcomes. Thus the aspects of social structure that creates value (James, 1990)

perspective (Adams & Simnett, 2011; Committee, 2011; Busco et al., 2013), stakeholders perspective (Adams & Simnett, 2011), its failures (Flower, 2015), its implementation challenges (Adams, 2015) etc. However, no other studies have examined the IIRC framework (2013) from the perspective of people, process, risk and trust. Previous studies show that the most important value creation assets of most organisation are its people (human capital), processes (corporate governance system), its ability to deal with risk and uncertainties (ensure financial health sustainability) and last but not the least how to manage trust issues of its key stakeholders such as equity holders. I contribute to the accounting and finance literature by examining IR from completely new and unique perspective in the context of people process, risk and trust.

Recently the IIRC has produced a framework that enhances a company's reporting by using multiple capital concepts and a description of a company's business model that allows a better communication of its value creation agenda. I argue that one of the best ways to disambiguate the IR discourse is trust. Trust is the pivot on which the wheels of governance and value creation revolves. Trust involves ability, integrity, benevolence and risk (Kramer, 1999). Therefore I examined the IR discourse from three key subheadings; The TMT strategic cognition audit committee effectiveness and bankruptcy risk. Diagram (1.2) below illustrate my IR framework which highlights the four key elements that should be included in IR of firms. This study therefore focuses on the effects of these three key capitals on corporate financial performance, value and risk. First, the chapter on **people** examines effects of TMT attributes on financial performance and value. Second, the chapter on **process** examines effects of AC attributes on financial performance during periods of uncertainties and stable periods. Third the chapter on social capital and corporate risk examines the effects of using combinations of TMT attributes and social networks with accounting information to predict corporate bankruptcy risk
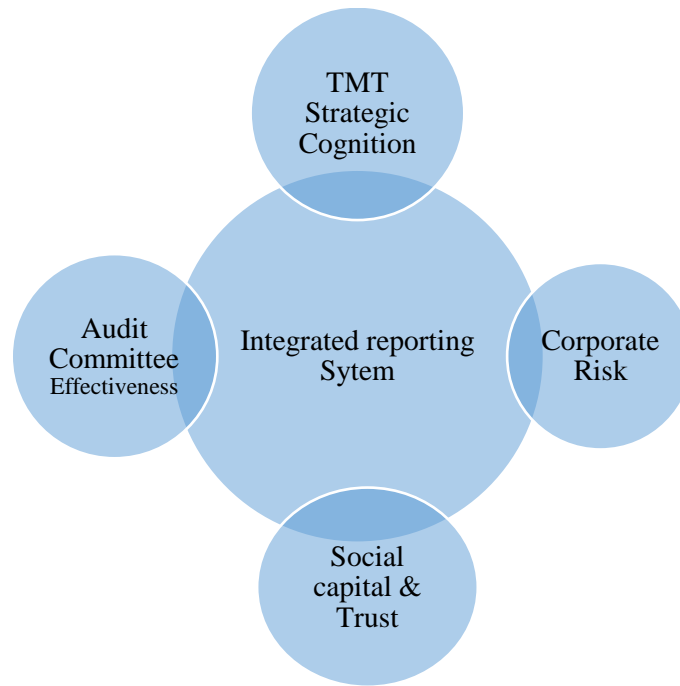
Proposed framework to disambiguate the IR Discourse

(Source; **authors own construction adopted from IIR framework 2013**)

Figure 1. 1 People process and Risk framework-IR system

1.3.3   People – Top management team integrated decision making

One of the key assets of most firms is the expertise of their top management team. The TMT expertise is influenced by their educational background, experience and network group. Most strategic decision and value creation in firms are conditioned by the TMT's. For example, the upper echelon theory implies that value creation decisions and processes of firms are conditioned by managerial characteristics including TMT educational background (Carpenter et al., 2004; DeFond et al., 2005; Bhagat et al., 2010; Darmadi, 2013; Kor & Mesko, 2013; Datta & Iskandar-Datta, 2014) TMT experience (Nonaka et al., 2000; Hoang & Rothaermel, 2005; Kor & Misangyi, 2008; Singh et al., 2010a; Tian et al., 2011), TMT elite network (D'Aveni, 1990; Lee & Brinton, 1996; Datta & Iskandar-Datta, 2014; Peters & Romi, 2014) and R&D intensity (Connolly & Hirschey, 2005; Artz et al., 2010; Padgett & Galan, 2010; Pandit et al., 2011).

TMT's are the people charged with the responsibility of producing the IR. Further, they are the people who monitor, evaluate, and review the IR. The production of effective and useful IR require trust. The entire IIRC (2013) framework revolves on trust. Chapter two of this thesis examines some of the trust issues that underpin TMT cognition process. Further, TMT strategy represent an integral part of the IR process. For example it is the TMT strategies that determines the ambitions, goals and the directions of the business. I argue that the mere mentioning of integrated thinking and strategic directions in the IR is meaningless. However, understanding the thinking processes and how TMT's create value can provide a better insight to policy makers and future researchers. The second chapter contributes to the IR literature in six ways (1) I examine the ability and the dynamic capabilities of the people behind the IR systems. (2) examined their thinking processes and how that can create value. (3) I examine the unique relational capital (Oxbridge, Elite network social capital (ENSC): either remove them or mention what they represent) that support managerial strategic cognition process. (4) I provide empirical analysis on TMT strategic cognition and effect on value creation (5) I examine the type of TMT education (academic or professional) and the type of TMT experience (general experience, industry specific, firm specific etc.) that maximises value creation. (6) I examine the effects of TMT innovativeness (R&D intensity) on value creation.

1.3.4 Processes – Corporate governance and AC effectiveness
Examining integrated reporting in the perspective Audit committee effectiveness

The processes involved in IIRC (2013) framework includes manufactured (physical products produced by the company) and financial (the pool of funds including, liquidity, profitability, capital structure of the firm). I argue that the internal control system of the company is the mechanism used by decision makers to control the manufacturing operations (products or services) of the firm. It is the responsibility of the audit committee (with the help of the internal auditor) to monitor, appraise and review the efficiency and

effectiveness of the internal control systems of the business. Further, it is the responsivity of the audit committee to oversee and monitor the financial reporting integrity of the company. The audit committee serve as custodians of shareholders trust. Their responsibility involves monitoring all the internal control systems and ensuring financial reporting integrity. The audit committee effectiveness therefore has a major influences on the activities and processes of the company. Therefore, I argue that not only does the audit committee support the value creation processes but also stakeholders will trust companies with stronger audit committee in comparison to those with weaker audit committee.

1.4 Corporate bankruptcy risk

Risk and uncertainties are the 'twin evil clouds' hanging around most businesses today. These two evils constitute the biggest threat to the survival of most companies. Companies that are able to identify the major risk factors and manage them effectively are able to create value. Therefore, I enhance the IR debate by examining details the bankruptcy risk predictors that threaten the survival of business. The purpose of IR is to communicate trust, sustainability and value creation to stakeholders (Adams & Simnett, 2011; Busco et al., 2013; Adams, 2015; Flower, 2015). Risky companies have higher probability of going bankrupt (Bryan, 2013; Danis et al., 2014; Darrat, 2016; Kadan et al., 2017). Further, previous studies show that examining the probability of bankruptcy risk of firms enable managers to identify which resource factors contribute significantly to the firm value creation process (Franzen, 2007; Eisdorfer, 2011; Bryan, 2013; Darrat, 2016). Companies that have higher probability of bankruptcy risk usually have little or no strategic focus (Platt & Platt, 2012; Darrat, 2016). They usually have poor information and communication systems (Beaver, 2005), poor relationship with their stakeholders(Freeman et al., 2004), poor governance systems in place (Fich & Slezak,

2008), poor business model and bleak future outlook (Erkens et al., 2012) etc. Therefore, I argue that, the debate about IR is incomplete if corporate bankruptcy risk of firms are left out in the discussions. Against the backdrop of the above, I examine different bankruptcy models and their probability of predicting corporate risk among firms.

This study contribute to the IR literature by (a) examining IR from different trust positions by using the throughput decision making model; (b) going beyond the IR framework to examining thinking processes of the people (TMT) who prepare IR; (c) providing further empirical analysis about the effectiveness of the audit committee during and after periods of economic instability; and (d) going beyond the sustainability element in the IR framework to explore corporate risk issues.

This thesis comprises five chapters. Chapter one comprises of introduction which consider my motivation to the study. In chapter two, I consider the effect of TMT attributes on corporate financial health and value; theoretical and empirical perspective. In chapter three I provide conceptual and empirical perspective of the effect of audit committee (AC) attributes on corporate financial health and value during the global financial crisis and post global financial crisis. I selected AC for further examination because AC is one of the most crucial corporate governance mechanism that have oversight and monitoring responsibilities over transactions and the financial reporting process. The fourth chapter of this study provide conceptual and empirical examination about the effects of combining accounting data and managerial attributes data to predict corporate bankruptcy risk. The fifth chapter of this thesis includes summary of my findings, practical implications and limitations of the study.

CHAPTER 2

The effects of top management team attributes and strategic cognition on corporate financial health and value: theoretical considerations and empirical perspective

2.1 Introduction

Over the years, several organisational theories have viewed organisational behaviour and its outcomes from varied perspectives. Some have looked at organisational behaviour and outcomes from the perspective of culture change (Hofstede 1984), while others have viewed organisational performance and outcomes from the perspective of competition among firms (Porters 1989) and technology changes (Adner and Kapoor 2010). For example, dynamic capabilities organisational theorists view the organisation as a biological entity with a five stage life cycle (example Mintzberg 1976).[5] They argue that like every living organism, organisations go through different life cycles, which include the existence stage, survival stage, success stage, renewal stage and decline stage (Mintzberg 1989; Lester et al. 2003). Critics of dynamic capabilities theory argue that organisations are not human beings, therefore the failure or success of organisations are significantly influenced by the TMT (Hanbrick 1984; Helfat 2015; Kor and Mesok 2014). For example, Helfat (2015) argues that organisations' growth and survival propensity is partially conditioned by the ability and the speed to which their top management responds to changes in the organisational environment. The upper echelon theory posits that organisational performance, strategic choices and outcomes are partially conditioned by the background characteristics of the top management (Hambrick 1984). The extant upper echelon theory literature has either focused on TMT attributes and firm outcomes (Kor 2008; Hamori et al. 2015, Herrmann 2014; Helfat 2015), or has looked at TMT effects on

organisational outcomes from the perspective of strategic decision making (for example, Bartuneck 1983; Carpenter 2004; Simsek 2005; Clarke and Maggitti 2012 etc.). Hambrick and Mason (1984) argued that cognitive attributes of top managers directly influence their decision making and firm outcomes. Carpenter (2004) and Simsek (2005) especially proposed that background education and experience would be reliable proxies to measure invisible cognitive attributes of TMTs. This proposal for studying top managers' cognition and influence on firm outcomes has fuelled the subsequent exponential growth in empirical research about top managers' demographics. As research on top managers' demography progresses, only few empirical studies have focused on TMT cognition and firm performance. Further, the validity of the previous empirical studies on TMT strategic cognition has used ordinary linear regression to test managerial cognition, which represents a very complex latent construct. Looking at TMT strategic cognition from a linear-demographic perspective has resulted in mixed results and conflicting views. Further, our knowledge about the managerial decision making black box and its implications for outcomes is limited. Against the backdrop of the above arguments, several questions have been left unanswered. For example, (a) what constitutes TMT cognition (mental maps), (b) what influences TMT cognition and (c) what are the effects of TMT cognition on outcomes. Moreover, most of the previous studies on TMT attributes have relied on a conceptual approach to explain TMT effects on outcomes (Kaplan 2011). Also, the few empirical studies that examine the effects of TMT attributes on outcomes focused mainly on the demographical characteristics of top managers and firm performance, with little or no consideration for the strategic thinking of top managers and firm outcomes. Kaplan (2011) argues that the empirical assessment of TMT cognition on outcomes requires a nonlinear measurement model due to the complex nature of cognition frameworks. Thus, the mental maps that influence TMT decision making process cannot be captured with a linear model. He therefore calls for further studies that are able to use a non-linear model to examine the effects of TMT cognition on firm outcomes. This study responds to that call by contributing to the upper echelon literature in five ways. First by integrating SEM-PLS

with a throughput decision making model to examine TMT strategic cognition effects on (a) corporate financial performance and (b) firm value. TMTs make strategic decisions and the product of their strategic decisions influences organisational outcomes. The throughput decision making framework captures all the possible cognition pathways that may be explored by TMTs during strategic decision making. Second, unlike previous studies, the models used in this study provide for the non-linearity associated with top managers' decision making processes. Previous studies focused mainly on the "soft" aspects of top management strategic cognition due to the complex nature of TMT cognition. This study uses a structural equation to capture the complex latent construct of managerial strategic cognition. Third, the study further explores the causal effects of other latent constructs, for example top management risk preference on strategic cognition using lagged effects. Fourth, this study simultaneously explores the effects of top management strategic cognition on firm performance and firm value all in one study. Last but not least, this study examines managerial networking (social capital) effects on firm performance and value from a completely different perspective. For example, I use a new construct Oxbridge to capture social networking effects on firm performance and firm value by top managers in our database who graduated from either Oxford or Cambridge. This study is the first empirical study that has included Oxbridge networking effects on top management.

2.2 TMT srategic cognition defined

TMT strategic cognition captures TMT's mental models (mental maps) during corporate strategic decision making process.[i] TMTSC is a dynamic process because it is influenced by each individual TMT's perception about a particular situation and their level of knowledge and understanding about the situation (Ensley and Pearce 2001; Capenter *et al* 2004; Clark and Maggitti 2012). The dynamic nature of TMT-SC implies that TMT

need to properly capture the true reflection of organizational performance.[ii] Further, strategic choices contain extreme complex and ambiguous tasks but human cognitive limitations may have adverse effects on strategic decision making due to bounded rationality (Simon, 1979). Hambrick *et al*. (2015) emphasize that there is no consensus in the literature regarding the effect of TMT composition on corporate outcomes. Different theories exist to explain the impact of TMT attributes on corporate performance. Some scholars argue that TMT strategic choices are usually governed by their self-interest (Eisenhardt, 1989; Nyberg, 2010). Other studies contend that strategic choices and corporate performance levels are partially predicted by TMT-SC and background characteristics (Hambrick & Mason, 1984). Institutional theorist argue that companies are the reflection of social structures composed of norms, routines, cultural-cognitive and regulatory elements with high degree of resilience (Campbell, 2007). TMT-SC which is an extension to the upper echelon theory is gaining popularity but our understanding of factors influencing TMT-SC is limited (Carpenter, 2004). Although there are several theories linking TMT-SC to firm performance, empirical research in this field is at infant stage. To extend the TMT-SC literature, Carpenter *et al*. (2004) called for the need to critically examine the TMT cognitive limitations and the other TMT cognition structures in order to better understand their effects on corporate performance. This study responds to this call by examining TMT-SC in four empirical dimensions including; *i*) education (Nadkarni, 2007; Cannella, 2008; Herrmann, 2014), *ii*) experience (Talke, 2010; Kor & Mesko, 2013; Hamori, 2015), *iii*) innovativeness (Talke, 2010; Li, 2013), and *iv*) risk preferences (Wright, 2007; Low, 2009; Cheng, 2010). This study is the first empirical study that integrate SEM-PLS with the throughput model to capture TMT strategic cognition (TMT-SC). This chapter therefore examine the mental maps of the top management team of the FTSE 311 companies and how they affect firm performance and value. Firms with better TMT's usually have better corporate governance system that

includes highly qualified and effective audit committee. Therefore in my third chapter I examine the effectiveness of the audit committee of the 311 FTSE companies in crisis periods and compared results to periods of stability.

Chapter two of this study is organised as follows; Section 2.1 involves the introduction of the study which also discuss research questions, research objectives and contributions. This is followed by a systematic literature review to identify gaps in the literature. Section 2.8 provides theoretical underpinnings to the study, section 2.9 show hypothesis developments for the study and empirical constructs. Section 2.14 data analysis and methodology, section 2.18 show empirical analysis and section 2.20 provide for the discussions of results and conclusions.

2.3   Chapter summary
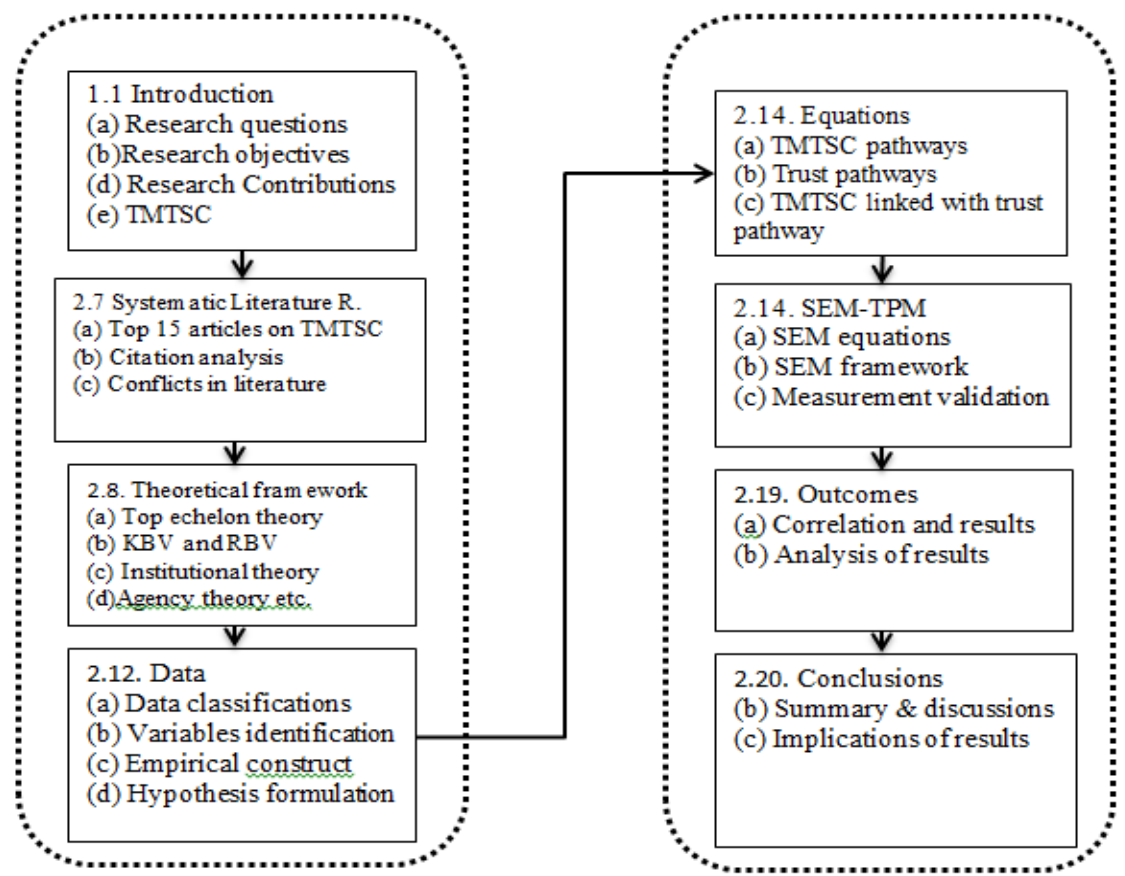
Figure 2. 1 Chapter summery

2.4 Research questions

The upper echelons theory implies that, the strategic directions and behaviours of firms are influenced by the collective cognitions and capabilities of their TMT's (Hambrick, 2007). Previous studies on TMT's have either focused on few demographic characteristics of executives or on specific functional background such as chief executive officer (CEO) tenure, CEO stock ownership etc. Hambrick, (2007) argue that, demographic characteristics of TMT's are incomplete albeit imprecise proxies of TMT cognitive frames. To predict strategic actions, researchers can reliably use combinations of TMT functional background especially, TMT educational background and experience to capture their cognitive frames (Hambrick, 2007). Some cognitive scholars argue that, the real psychological and social processes that drive TMT behaviour are cognitive (Kor, 2003; Hambrick, 2007; Nag & Gioia, 2012). However, few or no empirical research has been devoted to TMT strategic cognition so far. Therefore, our understanding about the effects of TMT strategic cognition on firm outcomes is limited. This study aims at addressing these shortcomings by providing answers to the following questions; what are the key TMT cognitive attributes? How can these attributes be measures empirically using proxies? Can we capture TMT cognitive ability using their education background and experience as proxy? Do positive effect of TMT-SC on firm value increases with relevant TMT education? Do positive effect of TMT-SC on firm value increases with relevant TMT experience? Do positive effect of TMT-SC on firm value increases with TMT risk taking, Do positive effect of TMT-SC on firm value increases with TMT innovativeness. Do positive effect of TMT-SC on firm financial health increases with TMT risk taking. Do positive effect of TMT-SC on firm financial health increases with TMT innovativeness. Do positive effect of TMT-SC on firm value increases with TMT social capital. Do positive effect of TMT-SC on firm financial health increases with TMT social capital.

2.5 Research objectives and outcomes

The central proposition of the upper echelon theory is that, TMT's experiences, educational background, values etc. significantly influences their cognition and strategic choices (Kor, 2003; Hambrick, 2007). Previous studies on TMT strategic cognition (TMTSC) are mostly conceptual. Among the key objectives of this study is to contribute to the literature on TMT strategic cognition by providing empirical evidence on the effects of TMT strategic cognition on firm performance. The main objective of this study includes; first, to measure TMT cognitive attributes using four key constructs which includes education, experience, innovativeness and risk preference as proxies. Second to empirically examine how each of the four cognitive constructs influences TMT strategic cognition. Third, to identify which TMT cognitive variable or combinations of variables that can secure optimum firm value and corporate financial health.

2.6 Research contributions

This study contributes to the literature in several ways. First, this study is the first to provide empirical evidence that examine effects of TMT-SC on firm value and financial health all in one study using combinations of throughput decision making model (TPDMM) with PLS-SEM.[iii] Second, the results from this study extend our understanding of previous studies that used conceptual approach or simple OLS in examining the effect of TMT-SC on firm performance (Simon, 1979; Lee, 1996; Nadkarni, 2007; Cannella, 2008; Talke, 2010; Narayanan, 2011). Third, this study provide extension to the upper echelon theory by providing empirical evidence that support the effects of social capital/elite network relationships on firm financial health and value. Fourth, this study contributes to the TMT-SC literature by combining multiple factors (i.e., social

networking, education, experience, risk taking and innovation capabilities) to measure TMT-SC as the previous studies relied on a single factor (Lee, 1996; Talke, 2010; Li, 2013), while capturing corporate financial performance and health also with multiple perspectives. Fifth, this study contribute to the strategic management literature by providing empirical evidence that show that the positive effect of TMT-SC on firm value increases with relevant TMT experience and TMT innovativeness. Last but not least, this study provides an extension to the resource-based and knowledge-based views by identifying idiosyncratic managerial attributes that can provide optimal benefits to firms.

2.7   TMT strategic cognition and dynamic capabilities

The dynamic capabilities literature posits that for firms to be sustainable, TMT's cognitive reflexes have to be sharpened in order to capture and quickly respond to environmental challenges (Helfat 2015; 2016). However, little research has focused on TMT decision making black box (TMT-SC) and how that influences performance. As a result, our understanding of TMT cognitive abilities as a dominant influence of corporate strategic decisions and firms outcomes is minimal (Nadkarni & Barr, 2008). TMT cognitive capabilities constitutes the bedrock of most corporate strategy formulation (Nadkarni & Barr, 2008). This study therefore aims at dissecting the cognitive constituents of the TMT in order to better understand which TMT cognitive element provide highest firm value. Tikkanen, et al (2005) define cognition as the conceptual and operational constructs that humans develop as a result of their interactions with complex systems. Some behavioural organisational theorist visualise strategic cognition as a process through which TMT's communicate their world view about their organisations and its external environment (Tikkanen et al., 2005). Previous studies on cognition measure cognition by using educational background and or experience. (Posner et al., 1997; Sternberg, 1999b; Ensley & Pearce, 2001; Cannella et al., 2008). In order to explore TMT cognitive capabilities, I followed Helfat (2015) by drawing on studies in cognitive psychology, social psychology, cognitive science and cognitive neuroscience. According to cognitive scholars, cognition is a process of acquiring knowledge and understanding through the use of schemata thus thought, experience, and the senses (Posner et al., 1997; Sternberg, 1999b; Ensley & Pearce, 2001). Schemata influences individual's perception, attention and absorption of new knowledge. Thus TMT are more likely to notice things which fit into their schemata. It is difficult to change another person's schemata even in a circumstance of contradictory information). The mind construct small scale models to

represent reality/facts-The image of the world people carry in their head), information structures (The articulation, processing and packaging of language) attention (ability to take possession of the mind and use it process information). Sensing involves the alertness and discovery process (Kor and Mesko, 2013, Teece, 2007, Helfat and Peteraf, 2015, Helfat and Peteraf, 2009, Ndofor et al., 2015). This is achieve through environmental scanning in order to take advantage of opportunities before someone takes it. Sensing are mostly draw from TMT perception; competence, experience and trust relations (Teece et al., 1997, Kor and Mesko, 2013, Helfat and Peteraf, 2015). Seizing involves taking advantage of a new opportunity by designing a new business model (Teece et al., 1997, Kor and Mesko, 2013, Helfat and Peteraf, 2015). Reconfiguration is a process adopted by TMT to achieve evolutionary fitness. It involves assets orchestration (selection, configuration, alignment, and modification of tangible and intangible assets) (Helfat and Peteraf, 2015).

2.7.1 The Interplay between TMT-SC, Consciousness, Conscience and Intuition

Neuro-Cognitive research posits that, there is a relationship between conscious, conscience, cognition and intuition (Woiceshyn, 2011). Consciousness provides the mental awareness about the situation/event, conscience provides enlightenment to our moral/ethical sense making, intuition is a psychological function that transmit perception subconsciously (Dane & Pratt, 2007). Intuition lubricates our moral sense making and mental awareness with suspicion and 'gut feelings (Dane & Pratt, 2007). Individuals who are working on judgemental task and have expertise in that domain may trust their intuition (Dane & Pratt, 2007). Cognition is a reflection of individuals mental models and private arguments, it involves conception of reasoning and legitimization of judgment (Hoefer & Green, 2016) The cognition capability is govern by the individuals perception

(De Jong & Dirks, 2012; 2013; Campagna et al., 2016; Jones & Shah, 2016), and perception is the manager that determines what type of information or knowledge to be acquired. There is a tendency for personal bias because our perception will only accept information or knowledge which supports our trust positions. Further, the next in command to TMT strategic cognition is intuition. Intuition is the vehicle that carries the instinct of the decision maker during process thinking. Intuition therefore provides the decision maker with a sense of ownership, direction and confidence during cognition. Some neuro-cognitive researchers argue that, intuition provides new knowledge as well as help in organising the storage systems in our subconscious mind(Dane & Pratt, 2007). TMT strategic cognition is an integrated mental processes which involves the understanding of the complex relationships between strategic cognition layers which includes; Cognition, conscious, conscience, and intuition. Each layer can provide a strategic dimension to the quality of the decision. Figure 2.2 and 2.3 below illustrates the levels of interplay between conscious, conscience, cognition and intuition.
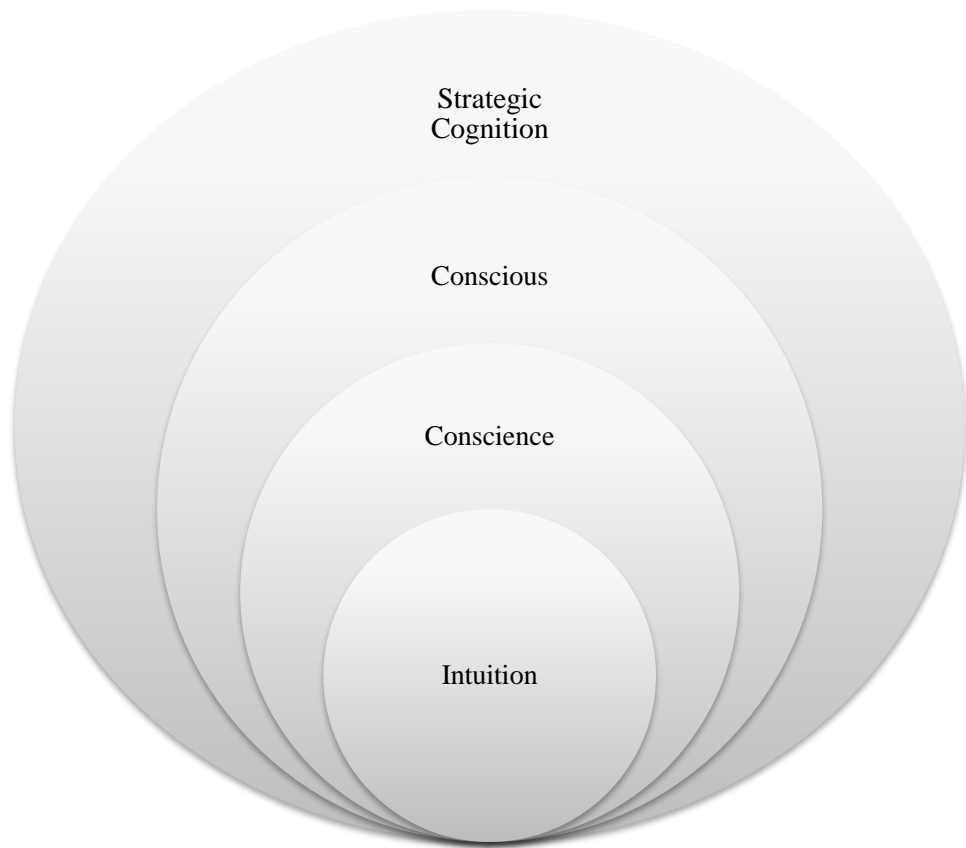
Figure 2. 2 TMT sense making during strategic cognition
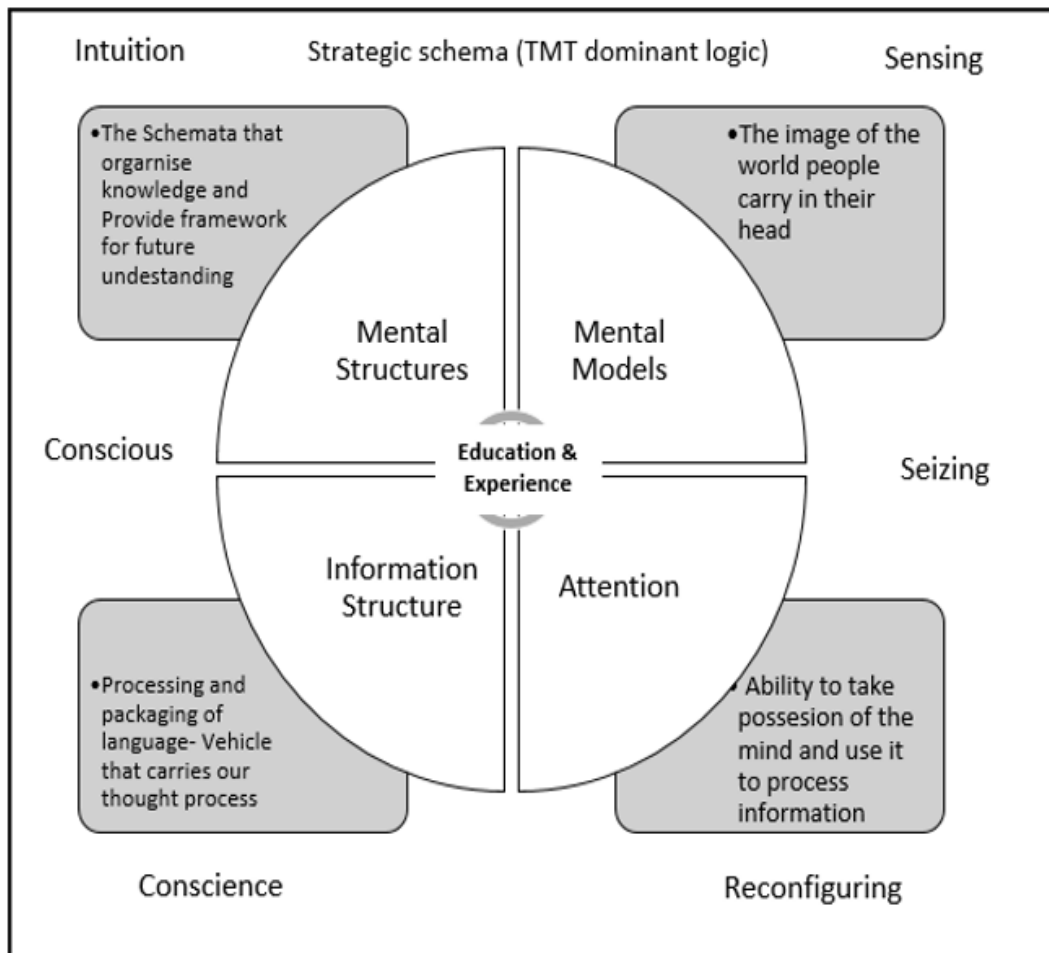
Figure 2. 3 TMT strategic cognition framework (adopted from Helfat 2015)

** The level of education (academic, professional) and experience (general, industry specific may affect TMT cognitive framework and strategic choice (Kor and Mesko, 2013, Teece, 2007, Hitt and Tyler, 1991, Helfat and Peteraf, 2009, Hambrick and Mason, 1984)

Education train the brain to think deeper and logical, experience provides the boundries for the thinking process (Glaser, 1984). Education and experience constitutes the basis for TMT strategic cognition Glaser (1984) argue that education enables individuals to develop cognitive structures and orgarnisation (i.e education provide structure to our mental models).The cognitive structures developed through education and experiences can influence the individuals mental structure, mental models, information structure and attention (Glaser, 1984, Hambrick and Mason, 1984, Hitt and Tyler, 1991, Kor and Mesko, 2013).

2.7.2 Systematic literature Review on TMT strategic cognition

I conducted a systematic literature review (following the process in figure 2.4) on the existing literature on TMT strategic cognition to provide transparency, clarity and focus to this study (Thorpe et al., 2005). Systematic literature review (SLR) enabled us to identify key gaps in the literature. Following Thorpe et al (2005), first I searched all the key database (google scholar, web of science and EBSCO), to find the most cited studies on TMT-SC. Second, I used exclusion analysis- - thus advance search criteria to whittle down my search findings to key peer reviewed articles on bankruptcy risk. Third, I used citation analysis to identify the top 25 articles on upper echelons and TMT-SC. Fourth, I conducted citation analysis in order to further pick the top fifteen most cited articles in the area. The diagram below shows the three stages.

Stage 1: searching the database:
We used phrases including strategic cognition and corporate performance or firm performance" TMT experience and firm performance, TMT education and firm performance synonyms; knowledge assets, intellectual capital, TMT innovativeness, TMT dynamic capabilities etc. to search the data base: advance search criteria -peer review articles Number of searches found

Stage 2: Exclusion analysis
we used the advance search criteria-Subject: accounting, finance and management, Articles: peer review, phrase; "strategic cognition", "TMT education and firm performance", "TMT experience and firm performance", "R&D intensity and firm performance etc. Exclusion criteria, year = 2000-2018,
Peer reviewed articles in 3 – 4* ABS.

Stage 3 Citation analysis
Using citation analysis we narrowed our search results by focusing on the top 11 most cited articles on TMT attributes, corporate governance, and TMT strategic cognition. Number of searches found (20)

Boolean searches

Figure 2. 4 Systematic Literature Review

Table 2.0 and figures 2.5, 2.6 and 2.7 respectively provides detailed background of some of the leading literature in my field of study. Table 2.1 examine the comments and perspective of these experts in relation to my study to better identify the key gaps in the literature

Table 1.0 citation analysis from the top most cited authors on TMT-SC

Author	Year	Journal	Total citation	Citation Analysis
Simon & Herbert (1979)	1979	The American economic review	3870	18.40%
Henderson, et. al (1994)	1994	Strategic management journal	3502	16.60%
Wiersema, et al	1992	Academy of Management Journal	2950	14.00%
Carpenter, & Mason et al (2004)	2004	Journal of management	1552	7.40%
Smith, et al	2005	Organization science	1552	7.40%
DeFond, et al	2005	Journal of accounting research	944	4.50%
Miller, et al	1998	Strategic management journal	697	3.30%
Kilduff, et al	2000	Organization science	637	3.00%
Nadkarni, et al	2007	Strategic management journal	518	2.50%
Hiller, et al	2005	Strategic Management Journal	477	2.30%
Cannella, et al	2008	Academy of Management Journal	455	2.20%
Sheng, et al	2011	Journal of Marketing	454	2.20%
Nadkarni, et al 2008	2008	Strategic management journal	454	2.20%
Palmer, et al 1999	1999	Strategic Management Journal	446	2.10%
Li, Jiatao &Tang, YI	2010	Academy of Management Journal	442	2.10%
Kor, et al	2005	Strategic Management Journal	425	2.00%
Smith, et al	2010	Long range planning	388	1.80%
Helfat, et a	2015	Strategic Management Journal	368	1.70%
Shin, et al	2012	Academy of Management Journal	339	1.60%
Nadkarni, et al	2010	Academy of Management Journal	314	1.50%
Gronum, et al	2012	Journal of Small Business Management	280	1.30%
Total citations			21064	100%

The Top 20 authors on TMT-Strategic Decision making
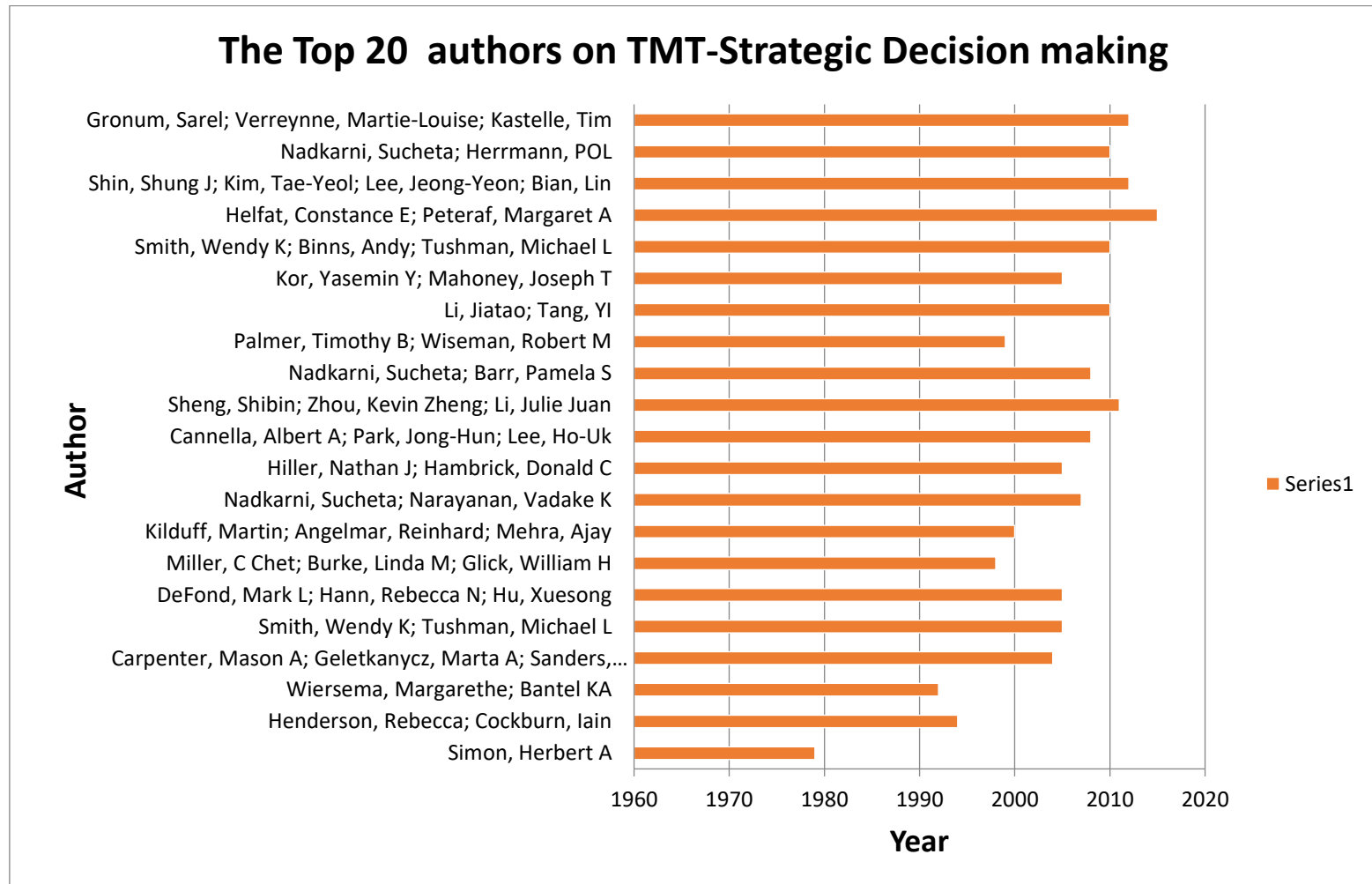
Figure 2. 5 Top 20 authors on TMT-strategic decision making

Total citation

Author	Total citation
Gronum, Sarel; Verreynne, Martie-Louise; Kastelle, Tim	
Nadkarni, Sucheta; Herrmann, POL	
Shin, Shung J; Kim, Tae-Yeol; Lee, Jeong-Yeon; Bian, Lin	
Helfat, Constance E; Peteraf, Margaret A	
Smith, Wendy K; Binns, Andy; Tushman, Michael L	
Kor, Yasemin Y; Mahoney, Joseph T	
Li, Jiatao; Tang, YI	
Palmer, Timothy B; Wiseman, Robert M	
Nadkarni, Sucheta; Barr, Pamela S	
Sheng, Shibin; Zhou, Kevin Zheng; Li, Julie Juan	
Cannella, Albert A; Park, Jong-Hun; Lee, Ho-Uk	
Hiller, Nathan J; Hambrick, Donald C	
Nadkarni, Sucheta; Narayanan, Vadake K	
Kilduff, Martin; Angelmar, Reinhard; Mehra, Ajay	
Miller, C Chet; Burke, Linda M; Glick, William H	
DeFond, Mark L; Hann, Rebecca N; Hu, Xuesong	
Smith, Wendy K; Tushman, Michael L	
Carpenter, Mason A; Geletkanycz, Marta A; Sanders,…	
Wiersema, Margarethe; Bantel KA	
Henderson, Rebecca; Cockburn, Iain	
Simon, Herbert A	

Figure 2. 6 Citation analysis of top 20 authors on TMT-strategic decision making

38

Top journals on TMT cognition and attributes

Strategic Management Journal
Journal of Small Business Management
Academy of Management Journal
Journal of Marketing
Academy of Management Journal
Long range planning
Academy of Management Journal
Strategic management journal
Academy of Management Journal
Strategic management journal
Strategic Management Journal
Strategic Management Journal
Journal of accounting research
Organization science
Journal of management
Organization science
Strategic Management Journal
Strategic management journal
Strategic management journal
Academy of Management Journal
The American economic review

■ Year

1960   1970   1980   1990   2000   2010   2020

Figure 2. 7 Top Journals on TMT attributes and firm performance

Table 2. 1 Top authors' perspectives about the effects of TMT attributes on outcomes

Author	Comments and Perspective	Journal	Total Citations
Simon and Herbert A (1979)	TMT cognition is influenced by their self-interest. Further, TMT are restricted in their cognitive capabilities due to inadequate and unreliable information coupled with time constraints	The American Economic Review	3870
Wiersema MF and Bantel KA (1992)	TMT cognitive perspective and strategic change are influenced by the team's demographic characteristics such as their educational background, educational specialization and academic training.	Academy of Management Journal	2950
Henderson et al, (1994)	Firm specific experience plays an integral role in TMT strategic cognition. Further Firm specific experience combined with information flow can provide positive effects on firm performance	Strategic Management Journal	3502
Miller, et al, (1998)	TMT cognitive diversity inhibits rather than promotes comprehensiveness and examination of current strategic opportunities and threats and thereby contributing negatively to firm performance	Strategic Management Journal	697
Kilduff, et al, (2000)	Results from a simulation of 35 chief executives decision making shows mixed results concerning TMT cognitive diversity and firm performance. For example, there was little evidence that TMT disagreement concerning g had any effects on firm performance.	Organisational Science	637
Carpenter, et al, (2004)	TMT perceptions of stimuli are filtered and interpreted through their cognitive bases and values. The values and cognitive bases of TMT is a function of their education background and work experience. The cognitive bases of TMT can influence significant organisational outcomes.	Journal of Management	1552

Author	Comments and Perspective	Journal	Total Citations
Smith, et al, (2005)	Sustainable performance is achieved when TMT's manage their cognitive diversities in the short term and explore the applicability of contradictory ideas at different level of analysis.	Organisational Science	1552
DeFond, et al, (2005)	Accounting and finance experts with firm specific experience have positive association with firm value. Thus the market reacts positively to the appointment of a financial expert to the audit committee, but only when the director has accounting-related qualifications	Journal of Accounting Research	944
Kor, Y et al, (2005; 2013)	Firm specific experience has positive association with firm performance. Tobin's Q is used to measure firm performance.	Strategic Management Journal	425
Nadkarni, et al, (2007)	TMT cognition is the knowledge structure that TMT use in making strategic decisions. Complex strategic schema enables TMT develop a comprehensive awareness of opportunities and hence develop resources to achieve better performance	Strategic Management Journal	454
Hambrick et al (2007)	TMT experiences, background education and values influences their interpretations of situations and strategic choices. However, managerial discretion and TMT's job demand can influence TMT to do a mental shortcut when faced with complex problems.	Academy of Management Journal	2000

Author	Comments and Perspective	Journal	Total Citations
Cannella, et al, (2008)	TMT intrapersonal functional diversity have positive association with firm performance	Academy of Management Journal	493
Nadkarni, et al, (2010)	TMT personality attributes such as their education background and experience may influence their attention focus and strategic flexibility. TMT with high attention focus and high strategic flexibility may notice and absorb new stimuli to enhance their cognitive capabilities for superior performance	Academy of Management Journal	314
Helfat, et al, (2015)	TMT dynamic capabilities for sensing, seizing, reconfiguring etc. are influenced by their cognitive abilities which may contribute to differential performance in organisations	Strategic Management Journal	368

2.8   Theoretical Framework

Top management strategic cognition is a complex latent construct that requires multiple theoretical expositions (Ensley and Pearce 2001; Kaplan 2011). Some strategic management scholars argue that, top manager's mental maps constitutes the greatest predictor of organisational strategic choices and outcomes (Ensley and Pearce 2001; Hambrick and Mason 1984; Simsek 2005; Kaplan 2011). Previous studies posit that, top managers thinking process is influenced by their knowledge base (Wernerfelt, 1995), personal interest (Jensen and Meckling 1976), perceptions and experience (Hambrick and Mason 1984), social relations and network (Acquaah 2007; Chen *et al* 2014) etc. The main theory that underpins this study is the upper echelon theory. However, due to the unique and complex nature of the constructs used in this study, I refer to other theories including agency theory, upper echelon theory, resource-based view (RBV), and knowledge-based view (KBV) and dynamic capabilities theories (DCT) and social networking theory as subsidiary theories to justify my arguments.

To avoid repetitions, all the theories use in the three chapters of this study have been explained in this chapter.

The agency theory assumes that TMT prioritize their self-interest in comparison to the interest of shareholders during strategic cognition process (Fama, 1980). Further, cognitive limitations associated with the mind of directors and the limited time and information can have a negative effect on top manager's strategic cognition (Kaplan 2011). Also, in some instances, top manager's opportunistic behaviour can influence their strategic cognition and strategic choice (Baker & Kiymaz, 2011).

2.8.1 Upper echelon theory

Upper echelon theory implies that organisational outcomes, strategic choices and organisational performance are partially conditioned by top management team managerial background (Hambrick and Mason 1984). Upper echelon theory commentators argue that the cognitive structures (mental maps) of top managers can provide a substantial predictions to organisational outcomes and strategic choices (Hambrick and Mason 1984; Simsek 2005; Kaplan 2011). Thus, Strategic cognition influences strategic choices (Hambrick and Mason 1984) and strategic choices determines organisational outcomes (Hambrick and Mason 1984; Simsek 2005; Kaplan 2011; Helfat 2015). March and Simon (1958) argues that cognitive frames (mental maps or mental models) of decision makers reflect their knowledge base (level of education) and their level of experience (Carpenter *et al* 2004). Other upper echelon theorist on the contrary argues that, top managers strategic choice reflect their perception about a particular situation (Kaplan 2011; Simsek 2005; Helfat 2015) together with their individual ethical positions (Hambrick and Mason 1984).

2.8.2 Resource based view (RBV) and Knowledge based view (KBV)

The RBV and KBV posits that firms can achieve competitive advantage by carefully maximising their unique tangible and intangible resource capabilities (Wernerfelt, 1995b; Barney et al., 2001; Vicente-Lorente, 2001; Kunc & Morecroft, 2010). Moreover, RBV and KBV scholars argue that firms can achieve a positive outcomes if they are able to protect their valuable and rare resources from imitation by rivals (Mahoney & Pandian, 1992; Li & Tsai, 2009). For example, KBV consider knowledge such as top management skills, expertise and experience as the most strategically significant organisational resources (Wernerfelt, 1995b; Barney et al., 2001; Vicente-Lorente, 2001; Kunc & Morecroft, 2010). The resource based view (RBV) of the firm was initially promoted by

Penrose (1959) and subsequently expanded by others (Wernerfelt 1984; Barney 1991). Unlike the KBV, the RBV visualise knowledge in a generic perspective. RBV argue that, firms are heterogeneous because each firm individual firms are endowed with unique resource mixes (assets, competencies and capabilities) that can provide sustained competitive advantage to the firm (Wernerfelt 1984; Barney 1991). The key limitation to the RBV is that, it does not distinguished the types of knowledge capabilities available to a firm. RBV therefore lacks in-depth description of the different cognitive elements that influence TMT strategic cognition (Barney & Hansen, 1994; El Shafeey & Trott, 2014). RBV assumes that once a firm understands how to use their valuable and rare resources, TMT strategic cognition and implementations processes are more effective (Barney, 1991). This is contrary to the views of other scholars who argue that, firms can maximize yields not because they have better resources but because they have TMT who possess unique dynamic capabilities that can be exploited during strategic decision making (Nadkarni, 2007; Cannella, 2008; Talke, 2010; Narayanan, 2011; Faleye, 2018). In furtherance to this argument, other scholars argue that the most valuable resource of firms are intangible such as the 'mindset of the top management team (Oliver, 1997; Grahovac & Miller, 2009; Moustaghfir, 2009; Wang et al., 2009; Kaplan 2011).

2.8.3 Dynamic managerial capabilities (DMC) theory.

The DMC theory posit that, firms can achieve sustained competitive advantage if managers are able to create, extend or modify the resource configurations of the firm (Helfat et al 2007; 2015). DMC is governed by TMT cognitive abilities (Helfat & Peteraf, 2009) which enable managers to integrate (Helfat 2015), share knowledge (Kor & Mesko, 2013), innovate Helfat & Peteraf, 2009), extend and re-engineer firms' resources and competencies (Helfat et al 2007;2015). Similarly, Teece et al. (1997) argue that dynamic capabilities explain the ability to incorporate, develop and reconfigure external and

internal core competencies to meet the challenges of the rapidly changing business environment. Dynamic capabilities enable TMT to scan their business environment in order to create, innovate and adopt the appropriate process to achieve evolutionary fitness for the organization (Kor & Mesko, 2013). TMT cognitive attributes and managerial capabilities can influence the manner in which firms employ, allocate and manage their resource capabilities (Wernerfelt, 1995a; Barney et al., 2001; Helfat & Peteraf, 2009; Ndofor et al., 2015). Wernerfelt (1984) posits that firms can generate high returns if they are able through TMT strategic cognition to identify and acquire resources that are critical for the production of highly demanded products. Although RBV explains ex-post firm performance, unlike the dynamic capability theory, it is quite limited and static in explaining ex-ante outcomes for managers seeking to build sustainable competitive advantage (Kor & Mesko, 2013). Further, to achieve competitive advantage-firms should be able to replicate valuable and rare routines or web of relationships by which resources can be coordinated and deployed (Wernerfelt, 1984).

I identify TMT education background/level and TMT experience as key factors to measure TMT cognitive capabilities (Helfat, 2015). Further, I draw on studies in cognitive psychology related to mental structures and schemata, social psychology, cognitive science and cognitive neuroscience. Cognitive underpinning of TMT dynamic capabilities can be captured at both macro and micro levels Teece *et al*, 2007). TMT perception, competence, experience and trust relations can influence their mind set and strategic choices (Moustaghfir, 2008; Kor & Mesko, 2013). To achieve evolutionary fitness TMT's strategic decisions have to align the firm's strategic ambition and resources capabilities to the social norms and environment challenges (Helfat & Peteraf, 2015).

2.8.4 Managerial social-networking theory (MSNT)

The micro-managerial networking relationship bring together a significant level of idiosyncratic, rare and unique bundle of intangible knowledge assets and superior information that can create value for firms(Moran 2005; Acquaah 2007; Chen et al 2014). Previous studies show that capital developed from managerial networking (strategic dialogue among managers) provide useful superior information that can enhance firm performance (Acquaah 2007; Chen et al 2014). The managerial social networking theory is a branch of social networking theory that implies that in a socio-political society, individuals actors are mostly drawn towards a relationship group that can offer them solutions to their unique personal problems. Actors within social networking group mostly share similar orientations, aspirations, motivations and ideologies (Moran 2005; Acquaah 2007). Actors in a networking group develop trust among each other over time and strive to exhibit trustworthy behaviour among each other (Moran 2005; Acquaah 2007; Chen et al 2014). Trust relationship that exist among actors within a network group enable them share superior information that can provide valuable solution to complex problems (Moran 2005; Acquaah 2007). One of my key argument in this study is based on the preposition that, top management share superior information (example trade secrets, inside information about competitors, emerging technology, new legislations etc.). The availability of this superior information can shape top management team strategic cognition and firm performance.

2.9 Hypothesis development

2.9.1 TMT education and experience

According to Helfat and Peteraf (2015), firms that have TMT with superior cognitive abilities can obtained competitive advantage over their rivals. Further, such firms usually have the three key drivers to dynamic managerial capabilities that includes; superior

human capital, social capital and superior cognitive capabilities for sensing and seizing emerging opportunities (Helfat, 2015). TMT cognitive capability for sensing is sharpened by their level of experience (Helfat, 2015). Neuroimaging studies reveals that brain structure depends on experience (Posner et al., 1997). Further the types and level of academic and professional qualifications can influence TMT cognitive capabilities and strategic change (Helfat & Peteraf, 2009; Helfat & Campo-Rembado, 2016) and TMT work experience (Teece et al., 1997; Kor & Mesko, 2013; Helfat & Peteraf, 2015). TMT educational background can influence strategic change of the firm (Zhang & Rajagopalan, 2010). Further, TMT professional education provide them with exceptional skills and experience to monitor the information relating to the corporate governance system of the firm (Frederick, 1991). For example, TMT serve as 'gatekeepers' of the financial integrity and reputation of the organizations. The educational background therefore plays a crucial role in effective corporate governance (Lee, 1996; Talke, 2010; 2011). Some cognitive scholars argue that TMT draw from their academic skills and knowledge during strategic cognition (Hambrick 1984; Kaplan 2011; Simsek 2005). TMT cognitive abilities are shaped by their level of education as well as their personal and professional experience (Wiersema & Bantel, 1992; Geletkanycz & Boyd, 2011; Kor & Mesko, 2013). However, as a result of TMT cognitive diversities (e.g., differences in experiences, cognitive abilities, beliefs and problem framing), some strategic cognition theorists argue that highly qualified and experienced TMT are most likely to disagree on key strategic issues due to their strong preferences and beliefs during strategic cognition (Hambrick, 2015; Healey, 2015; Bromiley, 2016) Previous studies on TMT strategic cognition rarely examined in details TMT cognitive abilities due to the problems associated with capturing the effects of TMT cognitive conflicts and its associated cognitive complexities (Kilduff, 2000; Nadkarni, 2008; Smith, 2010; Talke, 2010). Hambrick (1984) argue that TMT from varied educational background with varied experience may have different

schemata or perception about reality. Also, Kilduff *et al.* (2000) argue that the higher the cognitive diversity among TMT, the higher the interpretative ambiguity during TMT strategic cognition. Nadkarni and Barr (2008) on the hand argue that higher interpretative ambiguities lead to disagreements during strategic cognition, which will consequently have negative impact on firm performance. In furtherance to this argument Smith *et al.* (2010) posit that corporate performance can be enhanced by a dynamic and innovative TMT which have the 'team centric ability' to solve complex strategic problems and resolve strategic paradoxes (consequences of cognitive conflict)

Miller (1998) argue that, cognitive diversity implies highly qualified and experienced TMT will prefer to defend and justify their case rather than submitting to the opinions of their counterparts. Therefore, cognitive diversity might have a negative association with firm performance if not properly managed (Glick, 1993; Miller, 1998). Other cognitive scholars on the contrary argue that cognitive diversities involving relevant experience and relevant education can provide TMT-SC that increases firm value (Hambrick & Mason, 1984; Hitt & Tyler, 1991; Volonté, 2016a).

2.9.2   TMT cognition process and firm's outcomes

TMT cognition is a process that captures the mental map of TMT's and how TMT thinking processes influences firm's outcomes. The cognitive processes of TMT captures explain how TMT's interpret and translate information and perception into reality (Kaplan 2011; Simsek 2005). TMT perception serve as a filter through which they accept/reject certain types of information. Perception and information depends on each other in this study because the perception of a decision maker influences the choice of information the decision maker will use in solving the problem. On the other hand, the source, type and nature of information can influence the perception of the decision maker and consequently affect the judgment and choice. Factors such as biases, search patterns,

available information, time pressure, environmental conditions, and expertise level of the decision maker can influence configuration of TMT cognitive structures. Also, these TMT cognition process involve environmental scanning, sense making, analysis and evaluation of alternative cause of action judgment (Nadkarni, 2008; Narayanan, 2011; Herrmann, 2014).

TMT Innovativeness can provide competitive benefits to the firm. Investors perceive firms with high investment in innovative projects as profitable (Hermann 2014). Risk taking is crucial to TMT decision making process and because it has a positive implications for corporate financial performance and solvency (Li & Tang, 2010). Some scholars refer to upper echelon theory to investigate firm risk taking behaviour. For example, Berger et al. (2014) argue that background qualification, knowledge and experience of TMT can influence the propensity of risk taking in organizations. The upper echelon theory implies that TMT strategic choices result from bundles of unique TMT cognition resources such as education and experience (Talke et al., 2010). TMT strategic cognition is effective when TMT education and experience support higher innovation. Agency theory and top echelon theory imply that TMT strategic choices are influenced by their risk preferences and self-interests. Building on these theories, I argue that TMT are willing to take higher risk when their expertise levels in that venture is high and also where there is significant returns prospects (Gilley et al., 2002). Also, Hambrick (1984) argues that, TMT draws from their education and experience when they are confronted with intellectually challenging problems such as strategy formulation. This implies that TMT with high relevant education and experience can provide a better outcomes for organisations.

The resource-based and knowledge-based theories imply that organizations are endowed with a bundle of unique, rare and inimitable resources that can secure competitive benefits to the firm (Wernerfelt, 1995b; Barney et al., 2001; Kunc & Morecroft, 2010; Ndofor et

al., 2015). Therefore relevant education and experience acquired over the years by TMT's can provide the firm with competitive advantage and consequently add value to the firm (Wernerfelt, 1984). Above discussions lead to hypothesis which states that;

H1a: There is a positive relationship between TMT strategic cognition and firm value.

H1b: There is a positive relationship between TMT strategic cognition and firm financial health.

H 2a: The positive effect of TMT-SC on firm value increases with relevant TMT experience.

H2b: The positive effect of TMT-SC on firm value increases with relevant TMT education.

H2c: The positive effect of TMT-SC on firm financial health increases with relevant TMT experience.

H2d: The positive effect of TMT-SC on firm financial health increases with relevant TMT education.

Some strategic management scholars argue that TMT relevant experience has to be explicit in order to be effectively exploited (Nonaka et al., 2000). Therefore, general industry experience may not be explicitly applicable to specific firm situations (Hoang & Rothaermel, 2005). Also, TMT general experience from previous firms may exhibit diminishing marginal returns when applies to new firms during strategic cognition (Nonaka et al., 2000; Hoang & Rothaermel, 2005).

However, TMT industry-specific experience enables TMT acquire specialized knowledge and understanding about the industry within which the firm operates. Path dependency theory implies that TMT who spend substantial time in the same industry build specialized tacit experience about the industry. TMT members need to build industry know-how to be able to provide appropriate knowledge structures and the right interpretations to the emerging opportunities from the industry within which the firm operates. Kor and Mahoney (2005) argues that specific industry sectors are accustomed

with unique knowledge attributes including specific technologies, rules and regulations. Previous TMT industry-specific managerial experience can influence TMT-SC. For example, the resource-based theory maintains that firm-specific experience involving tacit knowledge about a firm's operations and resource capabilities influences TMT resource allocations decisions and strategic choices (Kor, 2003). Compared to managers who have general experience and are relatively new to the firm, managers with firm-specific experience can assess which opportunities emerging in the environment provides a better strategic fit for the firm (Penrose, 1959; Barney, 1991). Also, Path-dependent process of continuous interactions of TMT and a firm's resource capabilities will sharpen TMT innovative awareness and strategic lens (Kor, 2005). Against the backdrop of the above discussions, the empirical analyses in this study will consider the level and type of academic background and experience of TMT members and how each construct influences TMT strategic cognition and firm value and performance.

2.9.3   TMT risk preferences

Research on TMT risk preference is limited and scarce because previous studies have found it difficult to find a close proxy to measure TMT risk preference (Hiller, 2005). This study aims at filling the gap by contributing to the TMT strategic cognition literature by using combinations of firm level data and CEO delta as proxy to measure TMT risk preference. Some researchers argue that strategic decision making process is all about risk and risk management (Li & Yeh, 2010 2014). Risk taking has important implications for corporate financial performance and value (Sanders & Hambrick, 2007). Previous studies have examined risk taking in terms of performance feedback (Greve, 2003), slack (Greve, 2003; Li, 2010) environmental factors (Palmer, 1999), R&D expenditures (Li & Tang, 2010)2010), among other settings. These studies suggest that high managerial risk appetite is necessary to create wealth and performance at corporate level.

2.9.4 TMT innovativeness

The inherent ability of TMT to be creative and innovative to achieve evolutionary fitness is absolutely fundamental to the survival of organizations (Helfat 2015). Talke (2011) argue that sustained organizational performance depends on the ability of TMT to innovate. To be competitive, TMT have to explore the organisational environment in order to take advantage of unique and emerging opportunities (Helfat 2015). While exploitation focuses on building on the organizational past, exploration involves the use of creativity and innovation to reconstruct the future of the organization (Helfat 2015). Thus sustained organization performance depends on the TMT ability to adapt, reposition and change their business model through innovation (Smith & Tushman, 2005). TMT with high educational background usually have a favourable predisposition towards innovation (Hitt & Tyler, 1991). Other scholars posit that there is positive association between firm innovativeness and the TMT education diversities (Talke, 2011). The above views provide justification for choosing innovation and TMT educational background as constructs for measuring TMT strategic cognition. TMT strategic cognition is a knowledge asset which influences creativity and innovation in organizations (Smith & Tushman, 2005). Hambrick (1984) argue that highly educated and experienced TMT are more likely to promote innovation. Also, investors perceive organizations with innovative TMT are as more committed dynamic and profitable (Helfat 2015; Talke 2011). The discussions above lead to the hypothesis that;

H3a: The positive effect of TMT-SC on firm value increases with TMT risk taking.

H3b: The positive effect of TMT-SC on firm value increases with TMT innovativeness.

H3c: The positive effect of TMT-SC on firm financial health increases with TMT risk taking.

H3d: The positive effect of TMT-SC on firm financial health increases with TMT innovativeness.

2.9.5   TMT social capital

Networking theory and social capital theory posit that TMT can gain access to superior information and rare social capital embedded in networks outside their control by engaging with these networks and relationships (Williams, 2010; Sheng, 2011; Gronum, 2012). Networks provide a gateway through which TMT can tap into the wider 'social brain' to gain relevant information in solving complex strategic decisions. Institutional and social networks can potentially provide invaluable cognitive support and superior information that can significantly influence TMT strategic cognition (Williams, 2010; Sheng, 2011; Gronum, 2012). Oh and Barker (2018), for instance, show the relevance of social ties via CEO outside directorship to corporate R&D activities. Similarly, Zhang *et al*. (2018) find that strong industrial network among peer firms and political connections exert influence on R&D performance.

Managerial social capital involves the ability of TMT to tap into productive and strategic relationship network and connections (Molina-Morales, 2010 2013). TMT formal and informal networks from academic institutions, professional bodies, clubs, friends and trading partners can provide them with strategic information for decision making. TMT's through networking relationships can capture other world views and superior brains that can shape their strategic cognition and decision choices (Prahalad, 1986). Views from experts in a social network groups can influence TMT's personal belief, values, ethical stance etc. Inertia forces, cognitive biases converting objective evidence into subjective estimates, cognitive diversities etc. can impair the effectiveness of TMT strategic cognition and ultimately have a negative effect on firm performance (Hambrick & Mason, 1984 2014). However, this negativity can be mitigated via the presence of a relational based trust (Rodgers, 2010a; Schaubroeck et al., 2013). Therefore trusted Social networks (e.g., colleagues, friends and mentors) and institutional networks (e.g., professional membership groups and university alumni clubs) are pivotal in influencing TMT strategic

cognition. Trust relations among these networks enable members access to superior information which impacts how TMT perceive and interpret information about external environment during strategic cognition (Kor & Mesko, 2013). Gronum et al, (2012) argues that managerial social capital resides in a network of trusted complex relationships. The transmission of trustworthy information among managers within the network promotes knowledge sharing which can influence and improve the cognitive perspective of TMT (Nahapiet & Ghoshal, 1998). Acquaah (2012) provides empirical evidence which suggests that networking relationships have positive effects on firm performance. Overall, one would then conjecture that networking and quality social capital exert positive influence on corporate outcomes. The above arguments leads to the hypothesis that

H4a: The positive effect of TMT-SC on firm value increases with TMT social capital.

H4b: The positive effect of TMT-SC on firm financial health increases with TMT social capital.

2.10 Empirical Constructs

2.10.1 Corporate outcomes

I examine the contributions of perception (TMT strategic cognition, TMT innovativeness, TMT risk preference) to the financial health of firms as well as the overall market value of firms. To this end, I employed Altman's Z-score that measures the financial sustainability of the firms or the likelihood of firms going bankrupt (Rodgers, 2013; Altman, 2017). My proxy for firms' future growth options is Tobin's Q, which is the ratio of the market value of the firm to the replacement value of its assets (Berger et al., 2014 2005; Clinton et al., 2014 2014, Boeker, 1997, Wiersema et al., 1992, Datta et al., 2003, Herrmann et al., 2014., Darmadi et al., 2011).

2.10.2 TMT strategic cognition as a construct

One stream of upper echelon theory link TMTSC to strategic cognition and firm outcomes (Simsek, Veiga et al. 2005), whiles others link TMT to innovativeness (Daellenbach, McCarthy et al. 1999). For example, Capenter (2001) argue that TMT educational diversity and experience can provide an indicator of cognition processes embedded in TMT's. Thus TMT's experiences broadens their network and increases their strategic skills sets and worldwide views (Capenter and Fredrickson 2001, Hambrick 2007). Further, both work experience and education have been identified as important determinants of TMT leadership skills sets and worldwide mind-sets (Hordes, Clancy et al. 1995, Simsek, Veiga et al. 2005). This study extend upper echelon theory by providing empirical evidence about the relationship between TMTSC and firms outcomes. This study is the first to integrate throughput decision making framework (TPDMF) with PLS-SEM model (PLSSEM) to test empirically the relationship between TMTSC and firm's outcomes.

Following Cuncha et al (2010), this study used linear combinations of TMT's education and TMT experience to construct TMT strategic cognition. Managers draw from their relevant education knowledge and experience during problem solving situations such as strategic decision making (Kaplan, 2011; Simsek 2005; Hambrick 2015; Porac & Thomas, 2002). Previous studies on TMT strategic cognition (TMT-SC) used empirical measures such as education (Rajagopalan, 1997; Herrmann & Nadkarni, 2014; Bergman, 2016), experience (Hitt & Tyler, 1991 2007, Darmadi, 2013; Kor & Mesko, 2013; Volonté, 2016a) as proxy to measure TMT cognitive abilities. TMT-SC is shaped by TMT educational background, relevant experience and TMT social network groups (. Further, this study integrate TMT-SC with the throughput decision making model to better explain the various cognition pathways used by TMT's during strategic decision making at firm level. Thus, this study contribute to the RBV literature by suggesting that the managerial

cognition process hinges upon four key concepts, which are perception (P), information (I), judgement (J) and decision choice (D). These four 'cognition apparatus' is referred as the throughput framework in this study. The throughput model provides a systematic framework for mapping perception decision making and the strategic thoughts process (mental models) of TMT. In specific, I used a throughput model (Rodgers, 2010a; Rodgers et al., 2013; Rodgers et al., 2017) to capture the different cognition trajectories and stages that can influence firms' decisions.

Perception embodies the process through which decision makers identify, organize and interpret their sensory information in order to represent or understand the world around them. Investors' perception about an organization is influenced by their previous experience and preformatted ideas about the organization. I argue that investors rely on the expertise perception of TMT because the corporate governance framework, accounting systems, innovation and the risk preference of the organization are influenced by the educational background and experience of TMT. Information plays a crucial role in every decision making. I include some key accounting ratios to measure the financial health of firms in my investment decision making model. *Judgement* refers to the sorting, analysis, generating of alternative course of action and the ranking aspects of the decision making process. Personal biases can have negative effects on judgment. For example, sometimes investors may select information which confirms their 'pre-existing views' about the firm during the judgement stage (confirmatory bias). Further, some judgements are mostly influenced by the decision maker's preformatted ideas. Finally, *Decision choice* offers alternative course of actions to the decision maker. The type of decision selected can be influenced by the perception of the decision maker and the availability of information. Investors' perception of firm TMT strategic cognition efforts which include; TMT risk preference, TMT level of experience, educational background, and their

investment in innovation can influence financial health and value of firms. Figure 1 shows the throughput model framework.

2.10.3 TMT experience

I captured TMT experience by using general supervisory experience (DeFond, 2005; Dokko, 2009; Nadkarni, 2010; Nielsen, 2013) and industry-specific experience (Darmadi, 2013; Volonté, 2016a). TMT draw from their previous experience during strategic decision making (Kor, 2008; Li, 2010; Nadkarni, 2010; Acquaah, 2012; Herrmann, 2014; Hamori, 2015). Organizational theory, institutional theory, resource-based and knowledge-based views reaffirm the significant role of experience in strategic decision making. Psychometric cognition theory considers intelligence as hierarchical (Sternberg, 1999a; Ensley & Pearce, 2001; van der Maas et al., 2011; Heavey & Simsek, 2017). According to this view, cognitive ability comprises general intelligence and specific intelligence. The former includes broad visualization, broad mental representations, generalized belief, broad information processes and language fluency derived from formal education; the latter includes hierarchical and complex level of information processes operating on mental representations at varying levels of experience in order to adapt to, shape and select environment (Sternberg, 1985). I use educational background of TMT and their experience as the two key constructs to measure TMT cognition. Each construct is measured by specific indicators. I use TMT academic and professional qualifications as reflective indicators to measure TMT educational background. In addition, I use TMT general supervisory experience, industry-specific experience and firm-specific experience as a reflective indicator to measure TMT experience. I assumed reflective indicators to measure my construct because of the level of overlap and interchangeability of my indicators (Hair Jr et al., 2017).

2.10.4 TMT education

I use TMT education as a psychological construct that governs TMT strategic formulation and choices. The type and level of educational background of TMT shape their key assumptions and heuristics, perceptions and interpretations of their internal and external environment (Kor & Mesko, 2013). I used academic qualification and professional qualification of TMT as proxy to capture TMT education. I observed that TMT put on different cognitive lenses during strategic cognition. For example, a lawyer will look at new investment in a factory from a regulatory perspective whereas the financial expert will be focusing on the net present value (NPV) of the investment. This can lead to cognition diversity which if not well managed can result in a negative effect on firm performance. Further, most TMT are organized into various sub-units of specialized committees based on their level of skills (education) and expertise (experience) to improve corporate governance and strategic decision making. For example, in the UK, it is a statutory requirement for all companies registered in the FTSE 350 to have an audit committee made up of at least three members with one of the members as a financial expert.[4]

I captured TMT education using two dichotomous variable including academic qualifications (DeFond et al., 2005; Bhagat et al., 2010; Darmadi, 2013; Volonté, 2016b)) and professional qualifications to capture (Hitt et al., 2001; DeFond et al., 2005; Darmadi, 2013; Volonté, 2016b). TMT educational background is a strong determinant of their cognitive base (Hitt et al., 2001; Carpenter et al., 2004; DeFond et al., 2005; Bhagat et al., 2010; Darmadi, 2013; Volonté, 2016b). I captured the diverse cognitive abilities of TMT by combining different weightings related to academic and professional qualifications into a single construct (DeFond et al., 2005).

Some scholars argue that educational intelligence shows what people can/should do than what they actually do (Sternberg, 2007) As a result, it is the effective application of intelligence (cognition) which actually adds value to a firm. Scholars of cognition strategy recognize the negative implications of personal biases and heuristics. As a result, most strategic cognitive researchers use TMT education as a proxy for cognition (Hitt & Tyler, 1991; Geletkanycz & Boyd, 2011; Darmadi, 2013; Gottesman, 2015). Some scholars argue that education level is positively related to TMT innovativeness level (Hambrick & Mason, 1984; Tang et al., 2008; Rodgers et al., 2013; Hambrick, 2014). In this study, I consider strategic cognition that combines both (i) high expertise with innovation and high risk preference and (ii) education, experience and innovation.

2.10.5 TMT innovativeness

I measure TMT innovativeness by the ratio of research and development expenses to sales (Kor, 2003; Kor & Misangyi, 2008; Talke, 2010; Kor & Mesko, 2013). TMT with specific industry experience contribute positively towards TMT innovativeness during TMT strategic cognition. Further, previous studies showed that TMT with high educational provide supportive climate for innovation. Also, the diverse cognitive abilities (which result from different educational background and experience of TMT) can promote TMT innovativeness because cognition diversities will provide TMT with different strategic lens in solving strategic problems (Auh & Menguc, 2005). TMT cognitive diversities have a strong influence on firm strategic choices on product or service innovativeness and firm performance (Talke, 2010).

2.10.6 TMT risk preferences

Risk averse TMT can choose strategies that enhance their status quo thereby reducing the level of a firm's innovativeness. However, risk seeking TMT can be prone to engage in

highly innovative and competitive ventures that ultimately add value to the firm. Previous studies shows that risk preference of TMT is influenced by changes in the price of equity which is usually accompanied by changes in executive compensation (Chen *et al.*, 2015) and that CEO stock option shapes managerial risk perception (Sanders & Hambrick, 2007). my proxy for the TMT risk appetite is therefore *Delta*, which is the ratio of the change in price of an option to the changes in the price of the underlying asset, also called the hedge ratio (see Low, 2009, among others). Namely, CEO delta measures the sensitivity of CEO stock option and other compensations to stock returns volatility; higher values for delta indicates higher TMT risk appetite.

2.11 TMT strategic cognition equation

$$X_t = \beta_0 + \beta X_1 + \beta X_2 + \beta X_3 + \beta X_4 + \beta X_5 + \varepsilon_t \ \ldots\ldots\ldots\ldots\ldots\ldots\ldots.. \textbf{(Equation 1)}$$

Equation 1 provides the linear function of TMT strategic Cognition. However, previous study show that cognitive processes does not follow a linear function (Cunha et al., 2010). Therefore following Cuncha and Heckman (2010) I derive nonlinear function for TMT strategic cognition.

I denote $X_t = Congnitive\ structures$ at time t $\quad X_t = \sum_{x=x1\ldots\ldots xm}^{t} \varepsilon_t$

According to Cuncha and Heckman (2008; 2010) linear dynamic cognition skills formation mode assume that cognitive skills evolves over time. Therefore in this study in this study, I assume TMT cognitive skills is a function of the combinations of TMT education level, experience type and relationships (interactions with social network groups) developed over a period of time.

I denote $cognition = \emptyset\ and\ \oint x_1 = TMT\ academic\ education,\ \oint x_2 = TMT\ Professional\ education, \oint x_3 = TMT\ industry\ specific\ experience,$

$\oint x_4 = TMT\ General\ experience, \oint x_5 = TMT\ Social\ network.$

I denote S = skills or cognition level at time t

$$S \in \int_s^t \oint x_1 + \oint x_1 + \oint x_2 + \oint x_3 + \oint x_4 + \oint x_5 \dots \dots \dots .. S \dots \qquad \textbf{(Equation 2)}$$

TMT Cognition is an integral function of $x_1 = Level\ of\ academic\ education, x_2 = Level\ of\ professional\ education, x_3 = Level\ of\ industry\ specific\ experience, x_4 = Level\ of\ general\ experience, x_5 = Elite\ networking,$

$$\prod x_t = production\ of\ cognition\ stock\ at\ time\ t$$

TMT Cognition evolves $\emptyset s = \oint x_1 + \oint x_2 + \oint x_3 + \oint x_4 \dots + \oint x_5 \dots \dots .. Sn$ **(Equation 3)**

$$\prod x_t = production\ of\ cognition\ stock\ at\ time\ t$$

$$\emptyset s = TMT\ strategic\ cognition\ \left(\prod x_t, S \dots ..\right)$$

The Production of cognition stock in time t = $\emptyset s$

$$\emptyset s = \prod x_t \prod s \int_s^t \oint x_1 + \oint x_2 + \oint x_3 + \oint x_4 + \oint x_5 + \varepsilon_t \qquad \textbf{(Equation 4)}$$

Let φ_{CS}= denotes shocks and or unobserved inputs that affects accumulation of cognition skills (S)

$$\varphi_{CS} = \prod x_t \prod s \int_s^t \oint x_1 + \oint x_2 + \oint x_3 + \oint x_4 + \oint x_5 + \varphi_t + \varepsilon_t \qquad \textbf{(Equation 5)}$$

Where $\varphi_t = shocks\ and\ or\ unobserved\ input\ at\ a\ particular\ point\ in\ time\ that\ affect\ cognition$

ε_t = Error term

The Cognition process $\emptyset s$ in a period t and TMT Cognition capabilities depends on the level of cognition infrastructure and cognition stock available.

$$\varphi_{CS_{t+1}} = f\emptyset s, k(\emptyset s, Ik, t, \oint x_1 \oint x_2 \oint x_3 \oint x_4 \oint x_5) \qquad \textbf{(Equation 6)}$$

I assume that *f, s, k are differentiable factors that can influence the level of TMT strategic cognition*

Thus in my model, cognition process supported by the available cognition infrastructure (elite network, research and development etc.) can have a positive association with financial health and firm value.

Direct complementarity between the Cognition stock $\emptyset s$ and cognition infrastructure l and the complexity of strategic decision to be taking *Ik,t determines the level of cognition in period t*

$$\frac{\partial^2 f\emptyset s,k(n)}{\partial Ik,t\partial\emptyset l,t} > 0, \quad t \in \{1,\ldots\ldots T\}, \ l, \ k \ \in \ \{C, \ N\} \,. \qquad \textbf{(Equation 7)}$$

Period t TMT strategic cognition promotes TMT acquisition of more strategic cognition skills (through a combination of different period of strategic cognition skills) by making investment more productive.

A combination of different period of TMT strategic cognition skills $\emptyset s$ *(T + 1).*

TMT strategic cognition outcome j,Φj, is produced by a combination of different period T +

$$\Phi j = \phi j \left(\emptyset s X_1, T + 1, \emptyset s X_2, T + 1\emptyset s X_3, T + 1\emptyset s X_4, T + 1\emptyset s X_5, T + 1..\right), j \ \in \ \{1,\ldots\ldots,J\}$$

Equations 1-7shows that TMT-SC is influenced by complementarities of differentiable cognitive stocks at a particular point in time. Further, TMT's draw from a combinations of academic knowledge, professional knowledge, industry specific experience, general experience, elites network etc. during strategic cognition for a better outcome. I define this as cognitive stock $(\emptyset s_t)$ = Cognitive stock at a particular time *t*

In this paper I assume that TMT can deploy combinations of different $\emptyset s_t$

$\emptyset s X_1, t, \emptyset s X_2, t, \emptyset s X_3, t, \emptyset s X_4, t\emptyset s X_5, t, l X_1, l X_2, l X_3, l X_4 l X_5 \ldots$

$E = \sum_{x\ldots 1}^{t} \emptyset s X_1, t, \emptyset s X_2$

$E = \sum_{x\ldots 1}^{t} \emptyset s X_3, t, \emptyset s X_4$

$$\Pi = \sum_{x...1}^{t} \emptyset s X_5, t, \emptyset s X_6$$

E= or denotes Education (academic, professional etc.)

Ӗ = or denotes Experience (Industry specific, general, firm specific etc.)

Π = or denotes *Elite networks (Oxbridge, Elite professional institutions etc.)*

$l = denotes\ the\ level\ or\ intensity\ of\ cognition - high, low\ etc$

$\emptyset s =$ Cognition stock or the indicator to measure TMT strategic cognition $\emptyset s\ includes\ X_1 =$ $academic\ education, X_2 = professional\ educatio, X_3 =$

$Industry\ specific\ experience, X_4\ = general\ experience, X_4 = Elite\ networks\ etc.$

I used elasticity of substitution across different cognition stock in the production of outcome $\emptyset s$

2.11.1 Sensitivity of cognition diversity to outcomes

$The\ elasticity\ of\ substituting\ accross\ different\ cognitive\ stock\ (ESADCS)\ = \frac{1}{\emptyset sE}$ This

measures the level of sensitivities of each cognitive element to combinations of different

cognition stock.

$$\emptyset sE,_{t+1} = \left[\gamma_s E, 1\emptyset_{E,t}^{\theta sE} + \gamma_s E, 2\emptyset_{Ӗ,t}^{\theta sE} + \gamma_s E, 3I_{\Pi,t}^{\theta sE} + \gamma_s E, 4\emptyset_{Ӗ,E}^{\theta sE} \gamma_s E, 5\emptyset_{E\Pi,}^{\theta sE}\right]^{\frac{1}{\emptyset sE}} (Eqn\ 1)$$

$$\emptyset sӖ,_{t+1} = \left[\gamma_s Ӗ, 1\emptyset_{Ӗ,t}^{\theta sE} + \gamma_s Ӗ, 2\emptyset_{Ӗ,t}^{\theta sE} + \gamma_s Ӗ, 3I_{\Pi,t}^{\theta sE} + \gamma_s Ӗ, 4\emptyset_{Ӗ,E}^{\theta sE} \gamma_s Ӗ, 5\emptyset_{E\Pi,}^{\theta sE}\right]^{\frac{1}{\emptyset sӖ}} (Eqn\ 2)$$

$$\emptyset s, \Pi_{t+1} = \left[\gamma_s \Pi, 1\emptyset_{E,t}^{\theta sE} + \gamma_s \Pi, 2\emptyset_{Ӗ,t}^{\theta sE} + \gamma_s, \Pi\ 3I_{\Pi,t}^{\theta sE} + \gamma_s, \Pi\ 4\emptyset_{Ӗ,E}^{\theta sE} \gamma_s, \Pi\ 5\emptyset_{E\Pi,}^{\theta sE}\right]^{\frac{1}{\emptyset s\Pi}} (Eqn\ 3)$$

I make provisions for cognition deficit (Where available cognition structures in the company is

limited in addressing the strategic problem at time *t*. Cognition deficit is govern by parameter *P*.

Cognitive deficit *(p)* measures the probability of a cognitive discord or intellectual barrier that

can impair TMT strategic cognition (controlling for the limitation of TMT intellectual sense

making)

$\emptyset sP_E$ = Outcome that compensate for cognition deficit – I substitute P into equation *1-3*.

$$\emptyset sP_E = [\theta_1 E, P^\emptyset, 1\emptyset^{\theta sE}_{E,t} + \theta_2 E, P^\emptyset, 2\emptyset^{\theta sE}_{Ę,t} + \theta_3 E, P^\emptyset, 3I^{\theta sE}_{\Pi,t} +$$

$$\theta_4 E, P^\emptyset, \theta_4 E\emptyset^{\theta sE}_{Ę,E}\, \theta_5 E, P^\emptyset, 5\emptyset^{\theta sE}_{E\Pi,}]^{\frac{1}{\emptyset}} \tag{4}$$

$$\emptyset sP_Ę = [\theta_1 Ę, P^\emptyset, 1\emptyset^{\theta sE}_{E,t} + \theta_2 Ę, P^\emptyset, 2\emptyset^{\theta sE}_{Ę,t} + \theta_3 Ę, P^\emptyset, 3I^{\theta sE}_{\Pi,t} +$$

$$\theta_4 Ę, P^\emptyset, +\theta_4 Ę\emptyset^{\theta sE}_{Ę,E}\, \theta_5 Ę, P^\emptyset, 5\emptyset^{\theta sE}_{E\Pi,}]^{\frac{1}{\emptyset}} \tag{5}$$

$$\emptyset sP_\Pi = [\theta_1 \Pi, P^\emptyset, 1\emptyset^{\theta sE}_{E,t} + \theta_2 \Pi, P^\emptyset, 2\emptyset^{\theta sE}_{Ę,t} + \theta_3 \Pi, P^\emptyset, 3I^{\theta sE}_{\Pi,t} +$$

$$\theta_4 \Pi, P^\emptyset, \theta_4 E\emptyset^{\theta sE}_{Ę,E}\, \theta_5 \Pi, P^\emptyset, 5\emptyset^{\theta sE}_{E\Pi,}]^{\frac{1}{\emptyset}} \tag{6}$$

$Where\ \gamma_{s,}kI \in [0, 1\ or\ categorical\ ]$

I make provision for other cognition structures (*unobservables* (α)) that TMT can use during strategic cognition at *time t,* one can identify $1, E, \Pi, Ę, t, for\ \emptyset s \in \{2, 3, … … , X_1, t … . n\ \}$

The above model implies there is higher level of sensitivity between cognitive diversities and firms outcomes. Thus a positive association between cognitive stock and cognitive deficit can results in changes in firm's outcome. This is consistent with previous study that posit that cognitive diversities if not well managed can result to a negative effect on firm outcomes (Miller, 1998; Kilduff, 2000; Maitland, 2015).

2.11.2 TMT social capital – Elite university network and Oxbridge

Castells (2011) argues that the institutions and organizations are shaped by the interactions in a network among the employees and managers according to their values and interests. This network would constitute social power that can be considered as social capital with varying quality. Directors, for instance, who graduated from top universities or those with well-recognized professional qualifications might have different preferences, values, and aspirations compared to lower rated universities or less reputable professional qualifications. Following a similar approach adopted by (Lee), I use the Times-Higher Education (THES) World University Ranking[5] to capture TMT network capabilities originated from their academic background depending on whether TMT obtained their degrees from the top hundred universities worldwide. There is some survey

evidence and debate which suggest that obtaining a degree from the universities of Oxford or Cambridge (i.e., Oxbridge) can yield additional network power and the Oxbridge graduates can be cultural leaders.[6] To assess these considerations in my analyses I also construct an indicator for executives with Oxbridge background. In addition to the academic aspect of social capital, I further take into the consideration its professional aspect that can generate pivotal social power. Namely, I construct another indicator that shows whether the executives have obtained professional qualifications from highly reputable institutions (see Table 4.1 for the details).

2.11.3 Accounting information and ratios

Accounting and financial reporting information is a mechanism used by TMT to communicate their trust to investors. When TMT prepare financial report and discloses transactions, they are communicating trust (Rodgers 2013). Users of accounting information relies on key financial statement ratios to make their investment decision. Ratios such as profitability ratios, liquidity ratios, leverage ratios and efficiency ratios can serve as knowledge assets for most organisations because of the valuable information it provides to stakeholders (Rodgers *et al*., 2013). I used accounting-based measures of profitability, liquidity, efficiency and solvency ratios as benchmarks to measure financial position and health of firms. Return on assets (Chancey et al. 2016) and return on equity (ROE) are used to construct overall profitability (Darmadi, 2013; Rodgers et al., 2013; Berger, 2014 2013; Volonté, 2016a); current ratio, cash ratio and quick ratio are used to construct overall liquidity (Rodgers *et al*., 2013), debt to equity and debt to assets are used to construct overall leverage; assets turnover and sales to assets are used to construct overall efficiency (Li & Tang, 2010)2010). I measure firm performance by Tobin's Q (Talke, 2010; Rodgers, 2013). The definitions are provided in Table 2.5.

Firm age. Relatively established firms tend to weaken TMT's ability to take risk because TMT of older firms usually rely on the comfort of the well-established routines in their firms (Li & Tang, 2010)2010). However, some older firms might invest in research and innovation to sustain their strategic positions in the market. As a result, TMT innovativeness can be higher in older firms as they have the resource capabilities to invest in research and development. As the firms mature, they develop more robust structures and policies to improve their performance. Older firms have better communication channels, better understanding of their customer base, better understanding of the industry and market. TMT in older firms would then feel more comfortable to rely on organizational routines and culture during strategic cognition. Firm age can therefore be us as proxy for organizational inertia as in Li and Tang (2010). As investors trust TMT in older firms, this trust can have positive effects on firm value and financial health (Bansal et al., 2010 2014, Boeker, 1997, Li et al., 2009, Peng, 2004). Thus, as a control variable to weigh all these considerations, following Kor and Misangyi (2008) and Hermann and Nadkarni (2014), *Firm age* is defined as the logarithmic transformation of the number of years since the firm's inception.

2.11.4 Throughput decision making theory and TMTSC pathways

The throughput decision making theory (TPDMT) posit that the four key elements to organisational decision making includes; perception, information, judgment and decision choice(Rodgers & Gago, 2001). According to TPDMT, different combinations of the above decision making elements can provide decision makers with six decision making pathways as showed in figure 8 below. Following TPDMT, I present a throughput decision making model (TPDMM) to capture the different pathways and stages that influence TMTSC. Further I use TPDMT to provide a broad conceptual framework to sequence or arguments for the six TMTSC pathways. Following Rodgers (2000), I argue

that, TMTSC is conditioned by four key constructs. These include; TMT perception (P), Information available (I), Judgment (J) and Decision choice (D).

2.11.4.1 Perception

TMT Perception (P) embodies the process through which TMT's identify, organise and interpreted their sensory information in order to represent or understand the world around them (Rodgers, 2010a). TMT's perception about their organisation is influenced by their previous experience as well as their preformatted ideas about their organisation (Rodger 2001). TMT's cognition is mostly influenced by their own personal ideologies, value preferences, beliefs systems, organisational norms or culture etc. Thus TMT's perception is influenced by both internal and external forces. Internally, TMT perception is shaped by their views about the organisational culture and their own personal attributes including their level of education and experience. Further, external factors such as technology, globalisation, cybercrime, political situation, environmental regulations etc. can influence TMT perception or world view (Rodgers, 2010b).

2.11.4.2 Information

Information availability play a crucial role during TMT strategic cognition. TMT's require reliable, relevant and adequate information during strategy formulation. For example relevant accounting and financial information such as; profitability trend, liquidity situation, efficiency and gearing level of organisation. Information can be compared to ingredients for the preparation of food. All things being equal, better food requires the right amount of higher quality ingredients at the right time. TMT's who have access to the right quality of information at the right time are mostly better informed and can produce better outcomes (all things been equal). Further, TMT's who are experts in their field already have tacit knowledge that enhances their strategic cognitive abilities. Boland Jr et al (1994) posit that, cognition in an organisation involves sets of individuals exchanging information among each other within a system of roles or predetermined

organisational structure. In furtherance to this argument some organisational scientist posit that most organisational structures are preformatted to guide cognition process (Boland Jr et al., 1994). Boland Jr et al (1994) argue that such organisations have already distributed the cognition process across each layer of the organisational hierarchy so that individuals act autonomously within a decision domain. An example of the distributed cognition is the IT infrastructure in most organisations that coordinates the strategic decision making process of TMT

2.11.4.3 Judgement

Judgement refers to the sorting, analysis, generating of alternative course of action and the ranking aspects of the decision making process (Rodgers, 2010a). TMT's make personal judgment based on their perception and available information. However, Personal errors and biases can have a negative effect on TMT judgment. For example sometimes, TMT's may select information which confirms their 'pre-existing views' about the firm during the judgement stage (confirmatory bias). Further, sometimes some judgement is mostly influenced by the TMT's preformatted ideas or self interest

2.11.4.4 Decision choice

Decision choice is the last stage of the decision making process. TMT's are confronted with multiplicity of situations almost on a daily basis where choices have to be made. A wrong decision choice can have a devastating effect on the organisation. In this study, I argue that TMT's are confronted with six key cognition pathways that can affect the financial health and firm value. This cognition pathway is represented on diagram (3) below;
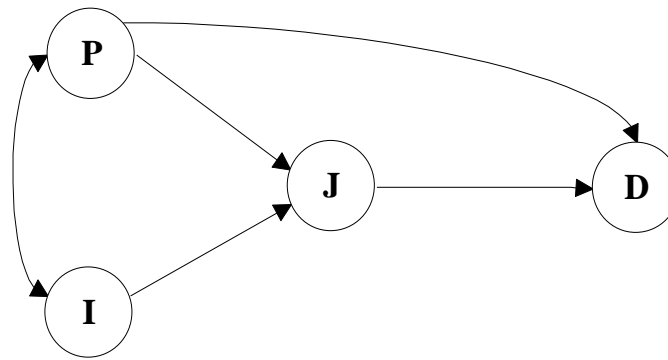
Figure 2. 8 the throughput model and the six decision making pathways

(Adopted from Rodgers et al 1997)

Table 2.2 below shows the six TMTSC pathways and their related ethical positions

Table 2. 2 TMT-SC pathways and ethical positions

TMT Cognition pathway	Description	TMT ethical stance
P→ D	The rational Cognition pathway	Ethical egoism
P→ J→ D	Rule-informed cognition pathway	Deontologist
I → J→ D	Category informed cognition pathway	Utilitarianism
I → P→D	Third-party informed cognition pathway	Relativism
P →I → J→ D	Role-informed cognition pathway	Social contract
I→P→ J→ D	Experience-informed cognition pathway	Ethical competence

The implementation of the TMTSC pathways is sturdily influenced by factors including TMT expertise level education, experience etc (Piaget & Cook, 1952; Hambrick & Mason, 1984; Capenter & Fredrickson, 2001), availability of information, time pressure and environmental factors (Rodgers 2001; 2013). The refinement of the interaction of people process and technology will influence information exchange and individuals perceptions.

The six pathways can be captured using the throughput Model (TPM). The TPM is a multi-stage cognition processing framework in which different cognition pathways are used to generate a set of outcomes. The TPM therefore provides insight into the density (structures) of TMTSC and the dominant cognition pathway adopted by the TMT of particular organisation in their strategic decision making process. Further the TPM provides insight into the different trust positions adopted by TMT during strategic cognition. The three basic antecedents of trust which are; ability, benevolence, and integrity/transparency are cognitive. Ability, benevolence and integrity are influenced by perception and perception is influenced by educational background, experience, relationships (internally and externally) etc. Therefore I argue that, TMT trust decisions can be better explained by using the throughput model. TMTSC pathways can be used to explain how TMT's adopt a particular line of thinking, why they select certain types of information and ignored other information sets during strategy formulation etc. Further, the TMTSC pathways can be used by IT experts and programmers to model the dominant cognition pathways that optimises organisational outcomes.

2.11.5 The six TMTSC pathways

In this chapter the six throughput pathways is integrated with TMTSC to provide a sequential arguments about the different decision making pathways that can be adopted by TMT during strategic decision making process. TMTSC is a cognitive exercise that is mainly influenced by perception and the nature and type of information available (Rodgers 2001). There are mostly six different decision making pathways. Following Rodgers (2001) I define the first three positions as lower level TMTSC pathway LLTMTSCP and the remaining three as upper level TMTSC pathways ULTMTSCP.

2.11.6 Lower level strategic cognition pathways (LLSCP)

The three TMTSC pathways are regarded as lower level or primary pathways because they are either influence by perception (P) or information but not both (Rodgers 2010). The three TMTSC pathways of rational informed, rules-informed and category-informed pathways are normative. Further, the three primary TMTSC pathways above re-enforces our understanding of the dominant logic used by TMT during strategic cognition. Each pathway can acquire the values ranging between +1(highest cognition coefficient) and -1(lowest cognition coefficient). Each path can have positive (+), negative (-) or zero (0) sign to represent the magnitude of TMTSC. The sign of the flow depend upon the relative importance or frequency of use of particular pathways in making strategic decisions. In order to explore the impact of each cognition pathway on corporate financial health and firm value, this study assume that any coefficient (factor loading) that is larger than or equal to 0.5 in absolute value has significant effect on financial health and firm value. On the contrary, a co-efficient (Factor loading) smaller than 0.5 in absolute terms is considered as insignificant to financial health or firm value.

2.11.6.1 P →D (Rational informed Cognition pathway (RICP)

The P→D also referred to us the rational informed cognition pathway is the quickest TMTSC pathway. In this pathway, TMT's are usually motivated to act in their perceived self-interest (Rodgers 1997). Thus TMT's prioritises their individual expected benefits against the corporate interest. Thus, TMT's mostly result to the RICP in situations of low risk, high certainty and less cost. For example, where the momentary amount involves in a particular transaction is negligible, TMT's may be more inclined towards the rational informed cognition pathway. Also, time pressure, difficult to interpret information, and a rapidly shifting environmental condition are among the factors which can influence TMT's to select the rational-informed cognition pathway. Further, in a high risk

situations, TMT's with high expertise level may ignore incomplete information and time pressure and take emergency decision(Rodgers, 2010b).

2.11.6.2 P →J →D Rule-informed Cognition pathway (RUICP)

The RUICP emphasises on the use of rules, laws regulations etc. to influence TMT strategic cognition (Rodgers 2009). In this pathway, TMT's can be influence by two key factors; their explicit contract and or the implicit contract. Under the explicit contract, TMT's cognition is influenced by factors including their contract of employment, job description and organisational policies and procedures. Regarding the implicit contract TMT's are influenced by their own personal values, beliefs, experiences, organisational culture etc. the RUICP is 'power driven'. In a risky/uncertain environment, organisations use 'command driven organisational structure' to influence individuals and corporate decisions. TMT's may adopt the RUICP as a result of influences such as; their past experience, belief systems, personal values, ethical stance, organisational norms, organisational policies, organisational culture etc. Rules, policies, personal values, organisational practices and mechanisms etc. are unlikely to change suddenly. Rather they are mentally represented as assimilated knowledge which impact on TMTSC.

2.11.6.3 I →J → D Category-informed Cognition pathway (CICP)

The CICP relies on the premise that, business entities, peoples and relationships types can be grouped into segments such that, each segment exhibit similar characteristic. For example, organisation may group their customer base into different market segments such that, each market segment exhibit certain unique characteristics. The level of trust assigned to each specific segment may be high/low depending on the relevance and reliability of the available information. In this pathway, TMT's perception of information regarding specific category of peoples, entities, etc. are preformatted. For example TMT may prioritise information from certain individuals or group because those individuals comes from elite background or belong to position of influence (D'Aveni, 1990). Also in

this pathway, TMT's may take a longer time to gather more data about situation especially when there is incomplete or unreliable information about a segment and vice versa.

2.11.7 Upper level strategic cognition pathways (ULSCP)

The higher level strategic Cognition pathways includes; third party-informed TMTSC, role-informed TMTSC and experience-informed TMTSC. The HLSCP is an ex ante to the primary pathways by adding either perception (P) or information (I). First, information (I) can influence the perception of the TMT and change as a rational choice into third *party–informed cognition* (I$\rightarrow$P$\rightarrow$D). Next, perception can influence TMT *categorisation process* (I$\rightarrow$J$\rightarrow$ D) into a role-informed cognition

(P $\rightarrow$ I$\rightarrow$ J $\rightarrow$D). Finally, as a result of the dynamic nature of the business environment, most experience TMT acquire valuable information through organisational learning (Kor 2013; Helfat 2015). Therefore, the level of knowledge and expertise TMT acquired over the years through organisational learning can lead to changing some existing rules or bypassing existing rules (P $\rightarrow$J $\rightarrow$D) to the higher level *experience-informed cognition pathway* (I$\rightarrow$ P $\rightarrow$J $\rightarrow$D).

2.11.7.1 I$\rightarrow$P$\rightarrow$D Third-party-informed Cognition pathway (TPICP).

In this pathway, TMT cognition is mainly influenced by information from a reliable and trusted third party or source. Rodgers *et al,* (1997) posit that, trust mostly develop among individuals who are embedded in a more complicated web of existing/potential relationships. Individual's trust position can be influenced by a complex web of third party relationship (Ferrin et al., 2006). The trustor and the trustee may be linked via trusted third parties including; social network, trust transferability (linked via a third party trust), structured third party (linked via similarity of interest) (Ferrin et al., 2006). TMT's are mostly well connected to the top echelon fraternity (Ferrin et al., 2006). Thus, TMT's either belong to higher level social group or professional bodies or may be

politically connected (D'Aveni, 1990). These networks provide valuable source of information to the TMT (Gronum *et al*, 2012).

2.11.7.2 P →I→J→ D Role informed Cognition pathway (ROICP).

In this pathway, the position, experience and academic qualifications of the TMT provide them with certain level of power and authority(D'Aveni, 1990). The perception of other board members about these well qualified and experience TMT's can influenced their cognition. The value individuals assign to information depends on their perception about the information source. For example TMT value information from experts who have outstanding track records in their field of expertise. Therefore in this pathway, it is the perception of the TMT that influences the type of information they select for decision making. For example Professionals such as Accountants/Auditors, Engineers, Doctors/consultants, etc. command respect and trust from their clients because of their role in society. Further, the behaviour of these professionals are govern by their professional bodies which entreat their members to uphold trustworthy standards including discipline, integrity, honesty and professional competence. Also, at the organisational level, employees are willing to follow manager's instructions due to the manager's organisational role and authority. Role based cognitive trust is driven by the role structures imposed by organizations, institutions, governments, society etc. on individuals. The structures in the organisation, chain of command, levels of authority etc. create a psychological contract of trust between mangers and their subordinates (van den Heuvel et al., 2015).

2.11.7.3 I →P→ J→ D Experienced informed Cognition (EICP).

The experience-informed cognition pathway mostly rely on tacit knowledge that TMT acquire through organisational learning. This is the highest level of the TMTSC pathway. TMT acquire both explicit and tacit (difficult to articulate) knowledge through their daily

interactions with the organisational routines and activities (Argote & Miron-Spektor, 2011). Most organisations have four key elements that can interact to create knowledge; these include; people, resources, network (relationship) and technology (Argote & Miron-Spektor, 2011). The interrelationship among these four components over time constitute the primary source of organisational learning. TMT's are responsible for managing these key components, therefore their problem solving skills improve overtime as they interact with the complex decisions regarding resources management and investment optimisation. Argote *et al* (2011) posit that TMT acquire transaction memory system overtime through organisational learning. Organisational learning is an ongoing cycle through which individuals build unique sets of experiences and knowledge as they perform their daily task (Argote & Miron-Spektor, 2011). In the experienced informed cognition pathway, TMT's perception are mostly influenced by the amount of knowledge and experiences acquired over their years through organisational learning. The EICP is mostly influenced by fewer time pressures because TMT's have the requisite expertise to deal with emergent situations as they occur (Rodgers 2009). Table 2.3 and 2.4 show the dominant positions used by TMT during strategic decision making together with their ethical implications.

Table 2. 3 Lower level TMTSC pathways and ethical positions

TRUST PATHWAY	INDIVIDUAL COGNITION STRUCTURE	INTER-PERSONAL COGNITION STRUCTURE	TMT COGNITION STRUCTURE	ETHICAL PATHWAY
RATIONAL INFORMED COGNITION PATHWAY	The individual mental model is governed by their self-interest. Their level of trust is based on opportunism. In this trust pathway, the manager is prepared to take more risk because shareholders bear the cost of the risk (Moral hazard)	TMT cognition is govern by greed, opportunism, peer group influence, influence from family, individual selfish interest etc.	In a rational informed cognition pathway, the mental model of each member within the TMT is motivated by encapsulated self-interest. Example TMT strategic cognition at this stage may be influenced by their performance bonus,	**EGOISM (P→D)** The dominant ethical principle which influence strategic cognition during a rational based trust relationship is Egoism.
RULE-INFORMED COGNITION PATHWAY	In this pathway, individuals trust the validity of organizational rules for guiding their decision-making. Individual mental model is influenced by rules and regulations at workplace in taking decisions pertaining to work.	TMT cognition is govern by the rules and regulations which must be followed by each member within the team. Interpersonal cognitive decision making is shaped by rules and regulations.	In this pathway, TMT strategic cognition is conditioned by organizational rules, policies and regulations. TMT trust validity and reliability of the rules in the organization.	**DEONTOLOGY (P→J→D)** TMT trust in the rightness and wrongness of their action based on the laid down rules rather than the consequences of their actions
CATEGORY-INFORMED COGNNITION PATHWAY	In this pathway, individual trust is based on preformatted information which has influenced the individual perception about membership in social or organizational category. For example employee cognition process may be influenced by the professional and social affiliations of the TMT.	As a results of cognitive consequences of categorization and in-group biases, individuals within a group tend to attribute positive inclinations towards one another. TMT therefore unite to make strategic decisions. "together we stand divided we fall"	TMT strategic cognition in this pathway is govern by their preformatted belief, views, knowledge, experience etc. about membership in social and organizational categorizations	**UTILITARIANISM (I→J→D)** TMT Strategic cognition is based on the ethical principles that the outcome of their decisions should benefit majority of stakeholders not the few.

Table 2. 4 Upper level TMTSC and ethical positions

TRUST PATHWAY	INDIVIDUAL COGNITION STRUCTURE	INTER-PERSONAL COGNITION STRUCTURE	TMT COGNITION STRUCTURE	ETHICAL PATHWAY
THIRD PARTY INFORMED COGNITION PATHWAY	In this pathway, third party is used as a conduit of trust because of their ability to propagate trust related information. Reliable grapevine information can influence employees trust decisions.	Gossips and grapevine can provide reliable source of information to in-group members. This second-hand source of information can influence TMT cognition	Information from the Press or social media about the organization can influence strategic cognition of TMT irrespective of the nature of information.	**RELATIVISM** (I→P→D) TMT ethical position is based on the need to respect for the moral norms of the society in which the firm operates.
ROLE-INFORMED COGNITION PATHWAY	Individual use the position/role of the other party example position of the TMT as a basis of their trust position. The level of expertise, competence, experience, professional affiliation can influence individual's trust level.	Professionals such as ACCA, CPA, CIMA, CFA, Doctors, and Lawyers etc. have acquired public trust due to their professional status and the requirements from their professional bodies. Expert information can influence TMT cognition.	TMT strategic cognition can be influenced by auditors report. TMT mental models are guided by the principles that, organization has a social contract which must be respected. That a breach of the social obligation will be catastrophic.	**Social contract** (P→I→J→D) TMT operate at a higher order level of personal virtues. Their strategic cognition is govern by their professional code of conduct. TMT Ethical principle is social contract driven.
EXPERIENCE INFORMED COGNITION PATHWAY	In this trust pathway, the individual does not only rely on their skills and expertise but also draw from their past experience (knowledge bank) in making trust decisions. This trust position is usually use by experts I. e consultants.	The interpersonal relationship among group members provides opportunities for knowledge sharing among members within the group. Less experience members benefit from the skills and knowledge of more experience members.	TMT cognition is influenced mostly by their previous experience. The mental model of TMT in taking strategic decision is incremental, because they use previous experience plus modifications to suit evolutionary fitness.	**Ethical Competence** (I→P→J→D) TMT has the expertise to take conscious decisions within given responsibility (Pohling et al., 2016)

2.11.8 Trust as a bedrock for TMT strategic cognition

Trust is the wheels on which superior information is release for effective strategy formulation (Rodgers et al 1997). However, little or no highlight on trust has been made in previous study on strategic cognition. For example, the dynamic capability theory (DMT) produces amazing insight on the effects of strategic renewal and dynamic fitness on outcomes, however, it fails to capture *how* organisation's set of managerial capabilities drives the unique resources of organisations during the decision making process. Thus, trust provide an in-depth understanding of (a) how the dynamic managerial capabilities (DMC) themselves are configured (Kor & Mesko, 2013) and (b) How TMT can share their knowledge and DMC across the length and breadth of the organisation to achieve evolutionary fitness. Trust is the gateway for superior information sharing and

the bedrock of TMT strategic cognition Rodgers *et al,* (1997). Without trust TMT will not be able to access all or most of the relevant information for strategic decision making. As a result I propose a unique framework in this study called the trust pathway which will illustrate different possible trust positions that can be adopted by TMT to achieve evolutionary fitness. I argue that, trust lies in the heart of TMT strategic cognition, as such, the literature on strategy and cognition should accord trust its fundamental place as the pivot on which the wheels of strategy rotates. Trust provides TMT's access to superior information during strategic cognition. Further, trust unleash free flow of valuables ideas and creativity among TMT's during strategic cognition (Kor & Mesko, 2013). Previous studies show that, both trustworthy and untrustworthy source of information evokes cognition (Mayo, 2015). They argue that trust lead to congruency in TMT cognition whereas distrust disrupts TMT cognition congruence. Thus the basic flow of cognition is trust or distrust dependent (Mayo, 2015).

2.12 Definition of trust

The extant literature on trust has still not been able to agree on one common definition of trust. Each discipline attempts to define trust in their own context thereby creating a discourse about what the real definition of trust is. For example the Psychologist see trust as a psychological contract where the trustee volunteers to be vulnerable based on positive expectations from the other party. Most social science researchers define trust as a social construct which is embedded within the fabric of the society (social brain). The neuro-social science scholars believe that, every society has a unique "social brain". This social brain involves a complex network of symbols, belief, culture, norms, rituals, stories, emotional infrastructure, physical infrastructure, physical and virtual networks etc. The social brain therefore has a strong influence on the cognition of individuals within the societies. The social brain argument is supported by some Cognitive psychologist who argue that every individual develops schemata (Nadkarni, 2007), which motivates the individual to act and think in a particular manner (Piaget, 1964). Example in England most people have schema for waiting in a line (queuing). Some psychology scholars argue that, this schema was developed after the Second World War during food rationing. As results the society has passed this onto the new generations. On the contrary, the economist sees trust as the difference between the actual behaviour and the real behaviour. Thus, to the economist trust can be explained by individual's quest to maximise their self-interest. To the economist, trust plays an integral role during the

wealth creation process. Thus trust is the force which brings parties to the transaction table, reduces cost of transaction and increase economic returns. The philosopher on the other hand see trust as a 'vehicle' which enables humans beings cope with the challenges and complexities of their world. This 'vehicle' includes; beliefs and religion which enables the individual to explain the 'un-explainable'. For example Christians, Moslems, Hindus' and other faith group trust their objects of worship irrespective. It is clear from the above discussions that, TMT's cognition process, intentions, perceptions, attitude, behaviour and actions are all govern by trust.

In this study, trust is define as a cognitive process that enables individuals volunteer to be vulnerable (Hill & O'Hara, 2006).

Trustworthiness on the other hand involves; competence, integrity, benevolence, transparency, reliability etc. Trustworthiness is an antecedent of trust i. e. TMT's who exhibit the qualities of trustworthiness can be trusted by colleagues (Such TMT's can influence TMT strategic cognition). Figure 2.9 show some of the element of trustworthiness relevant to TMTSC
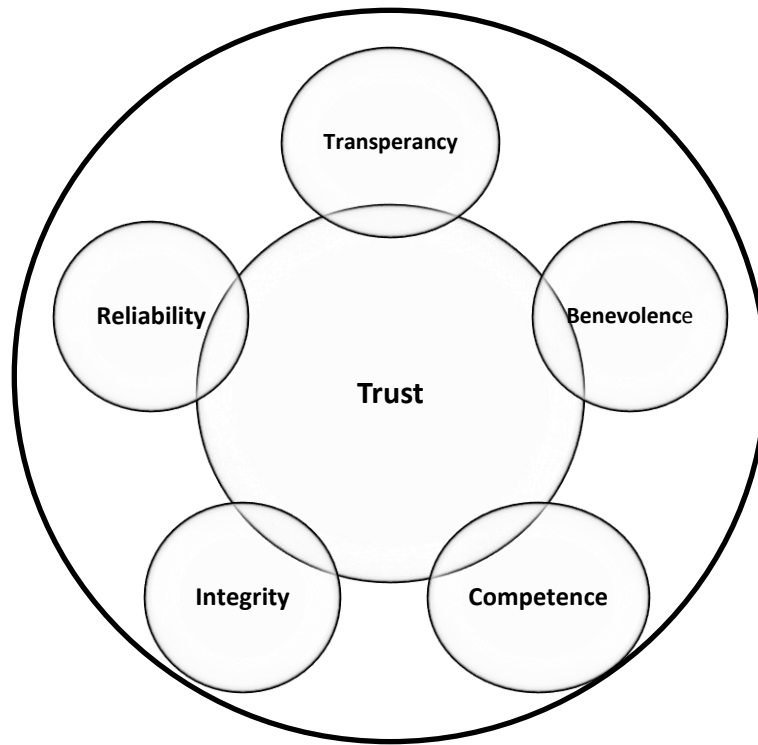
Figure 2. 9 Elements of TMT trustworthiness

TMT Trustworthiness[6] as antecedent of Trust

(Source: Authors own construction adopted from Colquitt et al 2007)

2.12.1 Trust as a strategic cognition element.

The psychological, economical, philosophical and sociological micro foundation of trust is a cognitive process (Miller, 1998; Hill & O'Hara, 2006). Trust is driven by perception of the other party's trustworthiness which includes; ability/competence, benevolence, integrity/transparency. The perception of the trustee is driven by information (I) and their accumulated knowledge (P). Their accumulated knowledge is shaped by factors

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[6] TMT Trustworthiness is identified by TMT attributes such as transparency, reliability, consistency, dependability etc.

including their educational background, experience, belief, culture, environment changes, time pressure etc. To achieve competitive advantage, TMT strategic decision making has to take place in an atmosphere of trust. Trust is the 'bedrock' for the dissemination and sharing of superior information (Mayer et al., 1995; Schoorman et al., 1996; Hardin, 2002; Rodgers, 2010a). Superior information is crucial for strategy formulation and implementation (Rousseau et al., 1998; Chua et al., 2008).

2.12.2 TMT trust propensity[7] during decision making

TMT's ability (expertise level), benevolence (kindness, reliability etc.) and integrity/transparency can influence other TMT's perception and their cognition pathways. Figure 2.10 below shows TMT propensity to trust their colleagues during cognition.
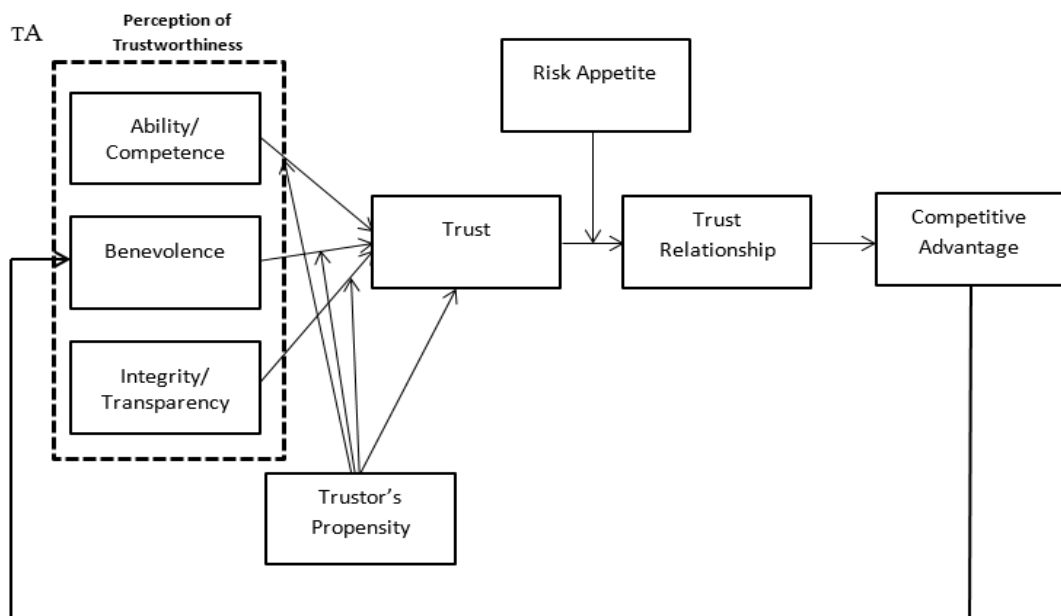
Figure 2. 10 TMT trust propensity during decision making

(Source: Authors own construction adopted from Colquitt et al 2007)

Ability is the inherent characteristics, skills and competences that enable an individual to have influence within specific sector (Mayer 1995). Benevolence is the extent to which the trustee is prepared to offer unconditional kindness to the trustor without any intrinsic reward. Integrity involves relationship in which the trustor perceived that the trustee will adhere to a set of acceptable principles. The issue of acceptability extends to consistency

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[7] Trust propensity involves a dispositional willingness to rely on others as a results of their trustworthiness attributes.

and reliability of the trustee past behaviours towards the trustor (Mayer et al 1996). Propensity to trust measures the willingness to trust others. This can be influenced by individuals, upbringing, religious belief, educational background, ethnic/cultural background etc. The risk appetite of the trustor can influence their propensity to trust. For example a trustor who is a risk averse will find it difficult to trust when they perceived higher level of risk. Trustworthiness in this context therefore depends on the trustees' ability, integrity and benevolence (Mayer 1995). It must however be emphasised that, trustworthiness is a continuum. Therefore high trust, low trust and mistrust can be measure by the trustee's perception of the trustors' ability integrity, benevolence, consistency, reliability etc.

2.12.3 Financial health equation

Following Rodger *et al* (2013) I used accounting based measures of profitability ratios, liquidity ratios, efficiency ratios and solvency ratio as a proxy to measure financial health of firms. TMT's perception in chapter is capture by three key constructs, i. e TMT strategic cognition (thus TMT relevant education and experience), TMT innovativeness, and TMT risk preference. Following Zmijewski (1984). Financial health of firms is captured using Z-score (key financial ratios including, profitability ratios, liquidity ratios, and leverage and efficiency ratios). Z-score also measures the financial sustainability of the firms or the likelihood of firms going bankrupt. The equation for Z-score is showed below;

$$Z\text{-}Score = \sum \beta_1 \, Profitability \, ratio + \beta_2 \, Liquidity \, ratio + \beta_3 \, Efficiency \, ratio + \beta_4 \, Solvency \, ratio$$

$$Profitability \, ratio = \sum \beta_1 \, (ROE) + \beta_2 \, (ROA)$$

$$Liquidity \, ratio = \sum \beta_1 \, (Current \, ratio) + \beta_2 \, (Cash \, ratio)$$

$$Efficiency \, ratio = \sum \beta_1 \left(\frac{Sales}{totol \, assets} \right) + \beta_2 \, (assets \, turnover \, ratio)$$

$$Leverage \quad ratio \quad = \quad \sum \beta_1 \, (Long \, term \, debt \, to \, total \, assets) + \beta_2 \, (Total \, debt \, to \, total \, equity)$$

ROA is return on assets and ROE is return on equity both were used to measure profitability which is consistent to Berger et al 2014 and Rodgers *et al*, 2013. I considered

the four sets of accounting ratios above as major determinants of firm's financial health. This is consistent with Rodgers et al 2013.

2.13 Results

Following *Hair et al*, (2017) I used PLS structural equation model (PLS-SEM) in this study due to the complex nature of the latent variables (TMT strategic cognition, TMT innovativeness and TMT risk preference) in this study. The PLS-SEM measurement theory provides theoretical and empirical capabilities that enables researchers capture complex latent constructs (Hair et al 2017). As my model involves complex latent constructs with multiples indicators (See figure 2.11), PLS-SEM is a proven multivariate data analytical method in most social science research. It is very useful in studies which involve using multiple indicators as proxy to capture complex latent constructs. PLS-SEM enable researchers explore or confirm relationships that exist between measurement indicators and latent construct as well as among the structural model (the relationships that exist between exogenous variables and endogenous variables). The exogenous variables in my module include; TMT strategic cognition, TMT innovativeness, TMT risk preference and the Accounting measures of financial health. My endogenous variables are Tobin's Q which measures the ratio of the market to book value of the company assets.

2.14 Methods

Following the suggestion in Kaplan et al (2011), I captured TMT cognitive capabilities (thus cognitive ability of each executive in my dataset) by collecting unique managerial level data about each board member (including their education background, experience, elite network group and social relationship etc.) and use it as proxy to capture the cognitive abilities of TMT's of these firms (Helfat 2015; Simsek 2005, Kaplan 2011, Clark and Maggitti 2012, Capenter et al 2004). Thus, the data collection for this study involves handpicked data from 2008 to 2016 about educational background and experience of over 14,175 Top executives of UK FTSE 350 companies. For every individual executive on the board (in most cases there is an average number of seven executives members on each board). To minimise the problems of missing data, I use combinations of data base (Bloomberg executive profile, Company financial statement information for each year and Compustat database) to collect unique personal information

about the cognitive attributes of each board member. There were few missing information due to inconsistencies in some of data in the company financial statements and the Bloomberg executive profile database. To be able to capture significant data about the cognitive attributes of each top manager, I used panel data to categorise my database into key broad sections. These data categorisation includes; academic qualifications of TMT's, professional qualifications of TMT's, general experience of TMT's, Industry specific experience of TMT's, firm-specific experience of TMT's, Oxbridge (thus if TMT's have qualification from oxford or Cambridge 1 otherwise 0), Elite network social capital (thus if TMT obtain their qualification from the top ranking 100 universities in the world 1 otherwise 0), elite professional network (thus if TMT obtain their qualification from the top ranking 100 universities in the world and also have elite professional qualification 1 otherwise 0), TMT risk preferences, TMT innovativeness etc.

Following Nielson (2013) and Darmadi *et al*, (2011) I define TMT as individuals who meet the following criteria; founders of the company who are chief executives (Nielsen, 2013) or individuals who take active role in the strategic decision making of the company such as Chief executive officer (CEO), president, Chairman of the board, Chief operating officer (COO), Managing director (MD), Chief finance officer (CFO), (Volonte et al 2016; Hambrick, et al 1984; Kor, et al 2005; Hit et al 1991; Nadkarni et al 2007; Darmadi et al 2011). Companies which have been delisted from or for which the TMT cannot be identified were deleted from my sample. After cleaning my data I was left with 13,470 TMT's data samples. I also used the Bloomberg database to collect other financial data including research and development over sales as proxy to measure TMT innovativeness, I used firm level data together with CEO delta as a proxy to measure TMT risk preference, this is consistent to Chin, et al (2015). Chin et al (2015) posits that Most executives are prepared to take risk when the share price of their companies increases, because the increase in stock prices are usually associated with higher executive compensation. Overall I constructed 13 models in this study to test my hypothesis. Each model is measured by indicators that are consistent with the underlying theoretical framework. As a result of the latent nature of the key construct in this study (TMT cognition) I used PLS-SEM to in this study to provide a better and robust analysis for TMTSC. Ringle et al (2015) argue that PLS-SEM provides better and reliable results for researchers who use latent and complex constructs in their study. Besides estimating path models with complex latent variables (such as TMTSC) using the PLS-SEM algorithm software enables robust analysis and more reliable results. Model estimations provides empirical

measures (path loadings or weights) to measure the relationship between the indicators (measurement models) and the constructs (structural model). In this study, I used reflective measurement model because the nature of my latent constructs reflect my measurement model (Hair et al 2017). As part of robustness, I checked for the reliability of my measurement models by examining the outer loading of each indicator to ensure that I meet the 0.70 outer loading thresholds. All measurements in my model have a loading level above 0.70. All loadings were significant at the 0.001 level (one-tailed). Further, this study pass internal consistency and reliability test (see results for composite reliability test and Cronbach's alpha in appendix 3). Following Hair et al (2017) I used the HTMT approach to test for the validity of the constructs used in all models in this study (see appendix 3)

2.15 Models building

Following Rodgers et al (2013), I integrate TMTSC into the throughput decision making framework to capture the possible cognitive pathways that can be used by TMT's during strategic decision making process. Using this approach is more appropriate for obtaining optimal prediction for measuring unobservable latent constructs such as TMT cognition (Rodgers, 2013; Trichterborn, 2016; Rodgers, 2017). Also adopting this framework will make it easier for me to specify how the latent variables are measured and in order to explore the overall relationships that exist between indicators and latent construct as well as among the structural model (i.e., the links between exogenous variables and endogenous variables) (see Hair *et al*., 2017). For the sake of further analysis, I called the framework used in this study the throughput decision making framework (TPDMF) as illustrated in figure 2.11 below
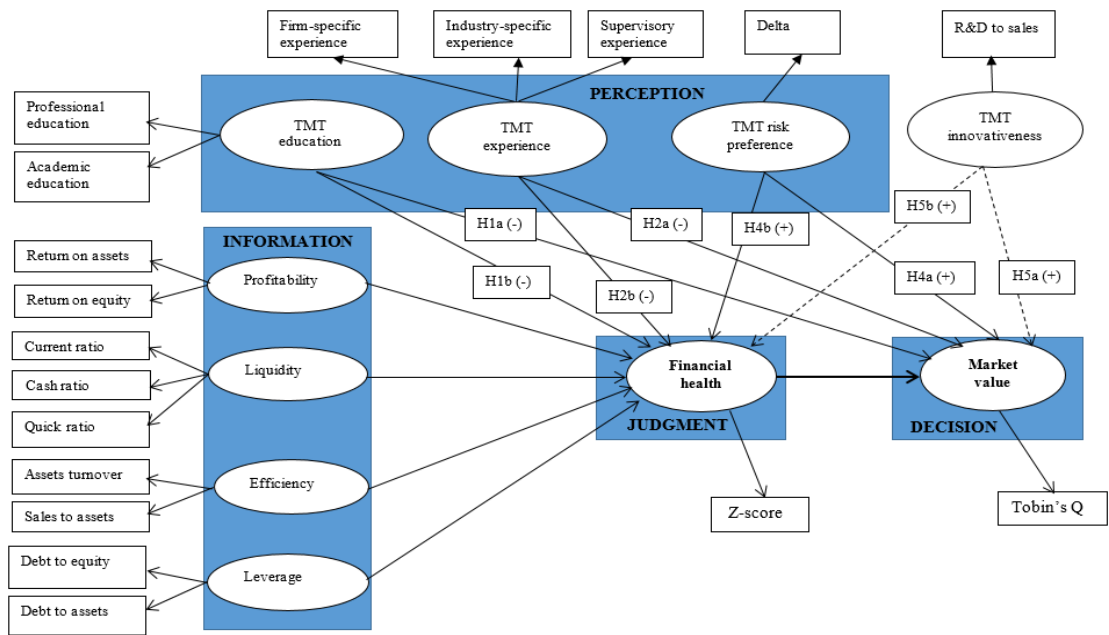
Figure 2. 11 TMT attributes framework and firm outcomes

(Adopted from Rodgers et al 2013)

2.16 TMT attributes and firm outcomes

Where Tobin's *Q* is my endogenous variable that represent firm value creation in the stock market; *Z-score* measures- as a mediating factor- the financial health of a firm depending on its level of solvency to support TMT cognition and determined by accounting information. *TMT education* is a latent construct based on *Professional education* and *Academic education*; *TMT experience* is a latent construct based on *Firm-specific experience*, *Industry-specific experience* and *Supervisory experience*; *TMT innovativeness* and *TMT risk preference* are latent constructs based on one indicator only (i.e., *R&D to sales* and *Delta*, respectively); *Profitability* is a latent construct based on *Return on assets* and *Return on equity*; *Efficiency* is a latent construct based on *Assets turnover* and *Sales to assets*; *Leverage* is a latent construct based on *Debt to equity* and *Debt to assets*; *Liquidity* is a latent construct based on *Current ratio*, *Cash ratio* and *Quick ratio*. The details and definitions of these factors are provided in Table 2.5

I also use the latent construct *TMT strategic cognition* as a proxy for overall TMT strategic cognition which is the linear combination of the constructs *TMT education* and *TMT experience* as formative indicators.

As this figure suggests, my *information* set consists of profitability, liquidity, efficiency and leverage of the firms; *perception* is related to the education, experience and risk appetite of the TMT. My framework then assumes that information set influences financial health as a *judgement*. It also assumes that investors' perception about TMT and innovativeness of TMT influence both financial health and market value of firms as a *decision choice.*

2.17   Data

To test my hypothesis, I collected data about TMT cognitive attributes (education background, experience, relational attributes etc.) from the FTSE 350 companies for periods between 2008 and 2016. After data cleaning which involves deleting firms with missing data, deleting inconsistent and extreme values (by identifying and addressing issues related to outliers), I ended up with 311 firms consisting of 2,799 firm-year observations in a balanced panel format. According to Kaplan (2011), previous cognitive researchers have relied on primary data collections techniques such as interviewing TMT's (example Ensley and Paerce 2001) about their decision making process to elicit their cognitive taxonomies. Critics of these approach (interviews, survey questionnaires etc.) argue that interviews or survey questionnaires are useful in capturing details of cognitive frames only at a particular point in time. However in a longitudinal perspective, interviews and survey questionnaires are susceptible to the risk of retrospective bias (Kaplan 2011; Simsek 2005). Kaplan (2011) argue that, the most reliable way of capturing cognition is to resort to a method that measure cognition as 'forward looking' process

based on the actors belief about the links between choices and actions. In furtherance to this argument, other cognitive scholars posit that actors background education and experiences influence their cognitive frames (Hamori *et al* 2015; Helfat 2015; Clark and Maggitti 2012; Ensley and Pearce 2001). Following the above lines of arguments, this study is among the first to use handpicked data about TMT educational background and experience to empirically examined TMT cognition. I painstakingly handpicked data about each individual TMT's on my 311 FTSE companies database from 2008-2016. Data about the names of each TMT, their educational background information (academic, professional or both), their experience (I categorised experienced into general, industry specific, firm specific etc. in order to examined how different combinations of experience and education influence TMT cognition) were handpicked for each of the 311 FTSE companies. Overall 14,175 individual TMT's data were collected from Bloomberg's executive profile and biography database. The reason for using Bloomberg's executive profile and biography database is that, there were several missing data about TMT's education background and experience in other database such as Bordex and the Execucomp. Moreover, using the Bloomberg database will ensure consistency in my data collection. I define TMT as individuals who meet the following criteria; founders of the company who are chief executives (Nielsen, 2013) or individuals who take active role in the strategic decision making of the company such as chief executive officer (CEO), president, chairman of the board, chief operating officer (COO), managing director (MD) and chief finance officer (CFO) (Hambrick & Mason, 1984; Hitt, 1991; Kor, 2006; Nadkarni, 2007; Darmadi, 2013; Volonté, 2016a). I used Bloomberg database to collect also other firm-level financial data.

2.18 Analysis and findings

2.18.1 Measurements and construct validation

Cognitive structures of TMT's are complex latent constructs that cannot be effectively examine with the traditional linear regression model (Kaplan 2011). Following Simsek (2005), I used partial least square-structural equation (PLS-SEM) to analyse my data. SEM enables researchers to rigorously examine complex latent constructs, theories and concepts (Hair Jr et al., 2016). Also, by using PLS-SEM I am able to assess TMT cognitive structures at the observation level (using outer or measurement model) as well as test the relationships between the different TMT-SC cognition pathways at theoretical levels (using structural modelling to test composite reliability, convergent validity discriminant validity etc.) To achieve robustness, I used 3,000 bootstrapping maximum iterations in the path analysis PLS algorithm to estimate each model. Model estimations provide path loadings or weights to measure the relationship between the indicators (measurement models) and the constructs (structural model). I used reflective measurement model because the nature of my latent constructs reflect my measurement model (Hair Jr et al., 2016). I checked for the reliability of the measurement models by examining the outer loading of each indicator to ensure that I meet the 0.70 threshold. All measurements in my model have a loading level above 0.70 and all loadings were significant at the 0.001 level (one-tailed).

In examining the internal consistency of my model, I examined the composite reliability, Cronbach's alpha and the average variance extracted reports. The composite reliability report examines the reliability and validity (internal consistency) of the latent constructs used in the structural model. The composite reliability uses either the Cronbach's alpha or composite validity to measure constructs validations. Composite reliability values below 0.6 indicate the lack of consistency: all my latent constructs show composite reliability above 0.7.

The composite reliability takes into accounts the standardised outer loadings of the indicator variables and a specific construct and the measurement errors of the indicator variables. The PCR equation is;

$$\rho_{cR} = \frac{(\sum_{i=1}^{M} l_i)^2}{(\sum_{i=1}^{M} l_i)^2 + \sum_{i=1}^{M} Var(e_i)},$$

Where PCR represents the composite reliability, l represents the standardised outer loadings of the indicator variable, i is the specific construct measured with M indicators, e is the measurement error of indicator variable I, and var (e_i) represents the variance of the measurement error which is defined as 1- l_i^2. (Hair et al 2017)

The average variance extracted *AVE* is used to assess the degree of variance between the latent constructs of the model. Following Chin et al (2003) and Rodgers et al (2013), I used the AVE to test the discriminant validity of my model. The AVE equation is showed below;

$$AVE = \frac{(\sum_{i=1}^{M} l_i)^2}{M}$$

An AVE value of 0.50 or higher shows that on average, the constructs explains more than half of the variance of the indicators (Hair et al 2017). Contrary, an AVE of less than 0.50 indicates that on average significant proportion of the variance are included in the error terms than in the variance explained by the construct (Hair et al 2017). My AVE were all greater than 0.60. The results of these robustness checks are included in table 2.9.

As part of my robustness test, I conducted bootstrapping based on 5000 random samples of my dataset using bias-corrected and accelerated bootstrap advanced settings with two-tailed tests. This specification is the most stable method of checking the robustness of structural models (Hair Jr et al., 2016). From My bootstrapping results, I further examined the significance of the path coefficient, outer loading, composite reliability focusing on the difference of outer loadings of the indicators, average variance extracted, Heterotrait-Monotrait ratio (HTMT)[7] for each model as well as the internal consistency and reliability of my model based on the inter-correlations of the indicators variables.

The average variance extracted (AVE) is used to assess the degree of variance between the latent constructs. I used AVE to test the discriminant validity of my model (Chin *et al.*, 2003; Rodgers *et al.*, 2013). AVE> 0.50 shows that, on average, the constructs explain more than half of the variance of the indicators; AVE <0.50 indicates that significant proportion of the variance is included in the error terms than in the variance explained by the construct (Hair Jr et al., 2016). My AVE are all greater than 0.60. This confirms the uniqueness of my constructs in explaining the Variance of the results and that my latent construct has the strongest correlation with its own indicators.

Convergent validity measures the extent to which a measurement indicator correlates positively with similar indicator measuring the same construct. As indicators of reflective constructs are interchangeable I used the outer loading and AVE to examine the convergent validity of my models. I measure the quality and uniqueness of each latent construct by conducting discriminant validity test which examines the extent to which a construct in my structural model is truly distinct from the other latent constructs in the model. Recent research has criticized using cross-loadings and Fornell-Larcker criterion for testing discriminant validity because of their inability to indicate discriminant validity especially when two constructs are perfectly correlated (Henseler *et al*., 2015). Rönkkö and Evermann (2013) further argue that Fornell-Larcker's AVEs are inaccurate because they determine one overall AVE instead of two separate values. As a remedy, Hair *et al*. (2016) recommend HTMT which measures the ratios between trait correlations to the within-trait correlation and estimates the true correlation between two latent constructs. My models show significant discriminant validity in my analyses because the values are positive and lower than 0.90. See tables 2.9 and Appendix 1 and 2 for the details. The definitions of all indicators are shown in Table 6. In Table 2.6, I provide the descriptive statistics and correlation matrix in table 2.7 respectively. Further, table 2.7 and table 2.8 show My PLS-SEM results and HTMT (discriminant validity) results.

Table 2. 5 Definition of variables

Indicators and constructs	Definition
TMT risk preference	This is measured by *Delta*, which is the ratio of the change in price of an option to the changes in the price of the underlying asset, i.e., the hedge ratio. Higher delta implies higher risk taking. (Source: Bloomberg)
TMT innovativeness	This is measured by *R&D to sales*, which is the ratio of R&D expenditure to total sales. (Source: Bloomberg)
Professional education	Categorical variable: 2, if TMT have received professional training for 3 years or more; 1, if TMT have received professional training between 1 and 2 years; 0, otherwise. The professional qualifications that we considered in our sample include this non-exhaustive list: Fellowship of the Royal Colleges of Surgeons (FRCS), Association of Chartered Accountants (Meier et al.), Chartered Institute of Management Accountants (CIMA), Chartered Financial Analyst (CFA), Chartered Institute of Marketing (CIM), Chartered Institute of Bankers (CIB), Chartered Engineers (CEng), Chartered surveyors (RICS), Chartered Institute of Actuaries (CIA), and lawyers, solicitors and barristers with legal practice course (LPC) qualification (Source: authors' own construction)
Elite professional	Dummy variable: 1, if TMT have professional qualifications from the institutions ACCA, CIMA, CFA, FRCS, CEng or with LPC qualification; 0, otherwise. (Source: authors' own construction)
Academic education	Categorical variable: 1 if TMT have graduate degrees; 2 if postgraduate degrees; 3 if PhD degrees; 0, otherwise.
TMT education	Proxy for TMT education as a latent construct, which is the linear combination of the indicators *Professional education* and *Academic education*. (Source: Authors' own construction)
Elite academic	Dummy variable: 1, if TMT graduated from the top 100 higher education institutions according to the ranking provided by The Times Higher Education in 2016; 0, otherwise]. (Source: authors' own construction)
Oxbridge	Dummy variable: 1, if TMT have degrees from the University of Oxford or University of Cambridge; 0, otherwise. (Source: authors' own construction)
Two elites	Dummy variable: 1, if both *Elite professional* and *Elite academic* dummy variables take the value of 1; 0, otherwise.
Firm-specific experience	Dummy variable: 1, if TMT have the specific expertise related to the core operations of the firm or if they have worked in the same firm for at least one year; 0, otherwise. (Source: authors' own construction).
Industry-specific experience	Dummy variable: 1, if TMT have expertise in the industry that their firm is operating; 0, otherwise. (Source: authors' own construction)
Supervisory experience	Dummy variable: 1, if TMT have previous experience as chief executive officer (CEO), chief finance officer (CFO), chief operating officer (COO), vice president, managing director or chairman; 0, otherwise. (Source: authors' own construction)
TMT experience	Proxy for TMT experience as a latent construct, which is the linear combination of the indicators *Firm-specific experience*, *Industry-specific experience* and *Supervisory experience*. (Source: authors' own construction)
TMT strategic cognition	Proxy for overall TMT strategic cognition as a latent construct, which is the linear combination of the constructs *Education* and *Experience*. (Source: authors' own construction)
Firm age	The number of years since the inception of the firm as of the corresponding year in the panel. (Source: Bloomberg)
Return on assets	ROA. Net income over total assets. (Source: Bloomberg)
Return on equity	ROE. Net income over equity capital. (Source: Bloomberg)
Profitability	Proxy for corporate profitability as a latent construct, which is the linear combination of ROA and ROE.
Current ratio	The ratio of current assets to current liabilities. (Source: Bloomberg)
Cash ratio	The ratio of cash and near cash items plus marketable securities & other short term investments to current liabilities. (Source: Bloomberg)
Quick ratio	The ratio of current assets less inventories to current liabilities. (Source: Bloomberg)
Liquidity	Proxy for corporate liquidity as a latent construct, which is the linear combination of *Current ratio*, *Cash ratio* and *Quick ratio*.
Debt to equity	The ratio of total debt to total book value of equity. (Source: Bloomberg)
Debt to assets	The ratio of total debt to total assets. (Source: Bloomberg)
Leverage	Proxy for corporate indebtedness as a latent construct, which is the linear combination of *Debt to equity* and *Debt to assets*.
Assets turnover	Total sales revenues divided by total assets. (Source: Bloomberg)
Sales to assets	Total sales revenues divided by net assets. (Source: Bloomberg)
Efficiency	Proxy for efficiency of corporate operations as a latent construct, which is the linear combination of *Assets turnover* and *Sales to assets*.
Tobin's Q	The ratio of the market value of firm to the replacement value of the firm's assets. (Source: Bloomberg)
Z-score	Proxy for financial health. Altman's Z-score is calculated as follows: [Z= 3.3*(EBIT/Tangible assets) +0.6*(Market value of equity/total liabilities) +1*(Sales/tangible assets) +1.2*(Working capital/tangible assets) +1.4*(retained earnings/tangible assets)]. (Source: Bloomberg)

The Sarbanes-Oxley Act define financial expert to include individual who have knowledge through education or previous work experience about the Generally Accepted Accounting Principles (GAAP), (ii) experience preparing, auditing, analyzing and interpreting of financial reports ((Greenwood & Buren Iii) Application of GAAP in relation to accounting estimates, accruals and reserves, (iv) internal controls and procedures for financial reporting (v) understanding of audit committee functions. However, after numerous complaints, SEC modified the definition of a financial expert to include any director that has supervisory responsibility over finance/accounting employees. This technically implies that TMT, CFO, MD and COO to qualify as finance experts.

See https://www.timeshighereducation.com/world-university-rankings.

According to a survey by executive search firm Heidrick & Struggles, 24% of FTSE 100 CEOs were found to be educated at Oxbridge. In Kirby (2016), this proportion is 31% among the UK-educated managers. This eliteness level is comparable to the levels in other countries: in the top 100 firms in the US Fortune 500, 28% were from Ivy League institutions; in France half of SF 120 CEOs went to one of four Grande Écoles; Germany may not have obvious elite universities yet 38% of DAX 30 and MDAX 50 CEOs have a PhD (Management Today, October 6th 2015, https://www.managementtoday.co.uk/foreigners-oxbridge-grads-top-ftse-100-companies/article/1367322). Davis (2018) provides an intriguing analysis about social circuits, social foundations of power, and networks of old boys' clubs and the relevance of having elite education in the business world. Also, another official document shows the dominant effects of FTSE 350 CEOs with Oxbridge degrees (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/347915/Elitist_ Britain_-_Final.pdf).

For the PLS-SEM specification, which is robust to small sample bias and has no assumption about the scale of measurement, the formal illustration for a latent construct (say, λ) can be shown as follows: $\lambda = \theta_1 x_1 + \theta_2 x_2 + \ldots + \theta_n x_n + \upsilon$. In this specification, x_n are observable indicators; θ_n represent the impact of the observable indicator on the latent construct; υ is the error term with the properties of $Cov(x_n, \upsilon) = E(\upsilon) = 0$ in order to assume exogeneity of the indicators.

HTMT measures the average of the heterotrait-heteromethod (i.e., the mean of all correlations of indicators across constructs measuring different constructs) relative to the average of the monotrait-heterotrait correlations which is the geometric mean of the average correlations of indicators measuring the same construct.

Table 2. 6 Summary statistics

Indicator	Mean	Median	SD	Minimum	Maximum	25%	50%	75%
Tobin's Q	1.93	1.430	2.949	0.453	80.938	1.061	1.430	2.094
Z-Score	5.169	3.530	9.884	-2.953	286.832	2.250	3.530	5.579
Professional Education	0.798	1.000	0.551	0.000	3.000	0.000	1.000	1.000
Academic Education	1.684	2.000	0.483	0.000	3.000	1.000	2.000	2.000
TMT education	0.643	0.000	0.752	0.000	2.000	0.000	0.000	1.000
Oxbridge	0.19	0.000	0.393	0.000	1.000	0.000	0.000	0.000
Elite Institution Capital	0.411	0.500	0.194	0.000	1.000	0.300	0.500	0.600
Firm Specific. Experience	0.509	1.000	0.560	0.000	1.000	0.000	1.000	1.000
Industry Specific .Experience	1.666	2.000	0.572	0.000	2.000	1.000	2.000	2.000
Supervisory Experience	0.997	1.000	0.743	0.000	2.000	0.000	1.000	2.000
General Experience	0.266	0.000	0.442	0.000	1.000	0.000	0.000	1.000
TMTSC	1.529	1.609	0.296	0.693	2.079	1.386	1.609	1.792
Age of firm	26.875	23.000	16.130	4.000	52.000	13.000	23.000	45.000
ROA	0.059	0.046	0.123	-0.739	2.355	0.005	0.046	0.092
ROE	0.179	0.124	0.723	-1.360	24.099	0.012	0.124	0.219
Current Ratio	1.879	1.292	3.414	0.030	61.978	0.888	1.292	1.804
Cash Ratio	0.783	0.282	3.263	0.001	53.476	0.143	0.282	0.543
Quick ratio	1.171	0.679	3.179	0.001	54.571	0.402	0.679	1.061
Debt to Equity	1.076	0.446	3.394	0.000	82.290	0.045	0.446	0.979
Debt to Asset	0.216	0.192	0.199	0.000	0.995	0.029	0.192	0.322
Assets Turnover Ratio	0.884	0.726	0.759	0.003	5.096	0.338	0.726	1.218
Sales to total assets	0.772	0.620	0.731	0.000	4.630	0.210	0.620	1.111
Independent Directors	0.591	0.600	0.127	0.105	0.929	0.500	0.600	0.667
CEO Delta	0.132	0.097	0.491	-0.964	2.989	-0.140	0.097	0.330
R&D to Sales	0.062	0.000	0.790	-0.003	20.756	0.000	0.000	0.005

Table 2. 7 Descriptive statistics and correlation matrix

Indicator	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)	0.132	0.491	1.000													
(2)	0.062	0.790	0.328**	1.000												
(3)	0.798	0.551	-0.054	-0.055	1.000											
(4)	1.684	0.483	-0.066	0.072	-0.066	1.000										
(5)	0.643	0.752	0.028	-0.005	0.180*	0.036	1.000									
(6)	0.260	0.393	0.143*	0.188*	-0.442**	0.632**	0.362**	1.000								
(7)	0.462	0.194	0.240**	0.042	-0.093	0.752**	0.372**	0.387**	1.000							
(8)	0.314	0.252	0.256**	0.142*	-0.087	0.532**	0.346**	0.108*	0.587**	1.000						
(9)	0.509	0.562	0.178*	-0.084	0.439**	0.031	-0.178*	-0.089	0.123*	0.123*	1.000					
(10)	1.666	0.572	0.041	0.222**	0.247**	0.181*	0.631**	0.181*	0.631**	0.431**	-0.162	1.000				
(11)	0.266	0.442	0.133*	0.054	0.566**	0.399**	0.187*	-0.381**	0.261**	0.241**	0.216**	0.457**	1.000			
(12)	0.997	0.743	0.182*	0.296**	0.098	0.058	0.046	0.143*	-0.052	-0.065	-0.127*	0.665**	0.352**	1.000		
(13)	1.529	0.296	0.134*	0.408**	-0.042	0.015	0.010	0.249**	0.208**	0.235**	0.323**	0.142*	0.064	0.356**	1.000	
(14)	26.875	16.130	-0.195	-0.155*	0.008	-0.082	0.417**	-0.044	-0.119*	-0.134*	-0.170*	0.417**	-0.315**	-0.144*	0.045	1.000
(15)	0.059	0.123	0.301**	0.313**	-0.069	-0.158*	0.062	0.348**	0.353**	0.213**	0.239**	0.024	-0.128*	0.259**	0.179**	0.264**
(16)	0.179	0.723	0.126*	0.425**	0.029	-0.054	0.009	0.312**	0.331**	0.306**	0.361**	0.117*	0.084	0.351**	0.265**	0.215**
(17)	1.879	3.414	0.068	0.277**	-0.086	0.062	-0.068	-0.070	-0.036	-0.052	-0.021	-0.073	-0.036	0.026	-0.080	-0.166
(18)	0.783	3.263	0.076	0.302**	-0.051	0.068	-0.135*	-0.036	-0.038	-0.041	0.036	-0.067	0.024	0.081	-0.063	-0.185*
(19)	1.171	3.179	0.078	0.305**	-0.051	0.063	-0.112*	-0.045	-0.042	-0.053	0.023	-0.065	0.012	0.067	-0.070	-0.176
(20)	1.076	3.394	-0.158*	0.349**	0.308*	0.017	-0.067	-0.272**	-0.378**	-0.327**	-0.009	0.064	0.365**	0.226**	0.612**	0.265**
(21)	0.216	0.199	-0.177*	0.025	0.359**	0.028	-0.028	-0.219**	-0.356**	-0.329**	0.086	-0.137*	0.254**	-0.105*	0.235**	0.227**
(22)	0.884	0.759	-0.122*	-0.322**	0.150*	-0.247*	0.275**	-0.164*	-0.249**	-0.235**	0.044	0.198*	0.188*	0.011	0.175*	0.143*
(23)	0.772	0.731	-0.108*	-0.310**	0.115*	-0.235**	0.260**	-0.153	-0.249**	-0.251**	0.028	0.218**	0.177*	0.047	0.160*	0.132*
(24)	1.930	2.949	0.363**	0.561**	-0.313**	0.045	0.073	0.538**	0.426**	0.516**	0.538**	0.538**	0.538**	0.338**	0.325**	0.335**
(25)	5.169	3.530	0.479**	0.534**	-0.320**	0.040	-0.156*	0.659**	0.365**	0.423**	0.359**	0.259**	0.259**	0.359**	0.022	0.325**

Indicator	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
(16)	0.751**	1.000								
(17)	0.106*	-0.056	1.000							
(18)	0.117*	-0.038	0.985**	1.000						
(19)	0.122*	-0.042	0.990**	0.999**	1.000					
(20)	0.107*	0.456**	-0.197*	-0.164*	-0.173*	1.000				
(21)	0.027	0.214**	-0.237**	-0.225**	-0.223**	0.747**	1.000			
(22)	0.040	-0.057	-0.353**	-0.328**	-0.324**	-0.078	-0.014	1.000		
(23)	0.025	-0.066	-0.344**	-0.319**	-0.316**	-0.088	-0.035	0.987**	1.000	
(24)	0.575**	0.353**	0.086	0.047	0.060	0.051	-0.022	-0.138*	-0.198*	1.000
(25)	0.394**	0.312**	0.545**	0.568**	0.571**	-0.286**	-0.357**	0.227**	0.221**	0.632**

Notes. TMT risk preference (1); TMT innovativeness (2); Professional education (3); Academic education (4); TMT education (5); Oxbridge (6); Elite academic (7); Elite professional (8); Firm-specific experience (9); Industry-specific experience (10); TMT experience (11); Supervisory experience (12); TMT strategic cognition (13); Firm age (14); Return on assets (15); Return on equity (16); Current ratio (17); Cash ratio (18); Quick ratio (19); Debt to equity (20); Debt to assets (21); Assets turnover (22); Sales to assets (23); Tobin's Q (24); Z-score (25). The asterisk * (**) shows that the Pearson coefficient is significant at the 5% (1%) level (two-tailed). See Table 1 for the definition of the variables.

Table 2. 8 PLS-SEM results for financial health and firm value

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
TMT education >Tobin's Q	-0.007	-0.067	-0.029	-0.007	0.009	-0.036	-0.018	-0.049	-0.213	-	-	-
	[0.923]	[0.309]	[0.339]	[0.946]	[0.345]	[0.234]	[0.413]	[0.452]	[0.000]	-	-	-
TMT education >Z-score	-0.160	-0.162	-0.041	-0.160	-0.049	-0.051	-0.045	-0.228	-0.194	-	-	-
	[0.038]	[0.098]	[0.204]	[0.001]	[0321]	[0.395]	[0.105]	[0.000]	[0.098]	-	-	-
TMT experience >Tobin's Q	-0.048	-0.032	-	-0.049	0.062	0.065	-	-	-0.078	0.069	0.080	0.098
	[0.495]	[0.681]		[0.484]	[0.049]	[0.003]			[0.345]	[0.007]	[0.003]	[0.001]
TMT experience >Z-score	-0.202	-0.177	-	-0.202	-0.105	0.051	-	-	-0.164	0.058	0.069	0.102
	[0.001]	[0.003]		[0.000]	[0.000]	[0.051]			[0.000]	[0.016]	[0.012]	[0.000]
TMT strategic cognition >Tobin's Q	0.066	0.182	0.187	0.084	0.160	0.303	0.280	0.166	0.190	0.078	0.089	0.113
	[0.103]	[0.000]	[0.002]	[0.011]	[0.002]	[0.000]	[0.004]	[0.102]	[0.000]	[0.009]	[0.007]	[0.000]
TMT strategic cognition >Z-score	0.084	0.164	0.288	0.116	0.289	0.129	0.046	0.062	0.062	0.183	0.199	0.218
	[0.101]	[0.000]	[0.000]	[0.051]	[0.000]	[0.005]	[0.104]	[0.098]	[0.098]	[0.009]	[0.000]	[0.000]
TMT risk preference >Tobin's Q	-	-	0.155	-	-	-	0.116	0.181	0.146	0.126	0.137	0.134
			[0.003]				[0.987]	[0.102]	[0.432]	[0.000]	[0.001]	[0.005]
TMT risk preference >Z-score	-	-	0.129	-	-	-	0.063	0.084	-0.076	0.068	0.097	0.084
			[0.004]				[0.276]	[0.346]	[0.216]	[0.080]	[0.070]	[0.076]
TMT innovativeness >Tobin's Q	-	0.110	0.175	0.008	0.072	0.103	0.050	0.036	0.109	0.131	0.166	0.160
		[0.003]	[0.001]	[0.687]	[0.008]	[0.007]	[0.054]	[0.102]	[0.006]	[0.004]	[0.001]	[0.002]
TMT innovativeness >Z-score	-	0.234	0.163	0.016	0.024	0.067	0.011	0.042	0.148	0.219	0.244	0.197
		[0.000]	[0.000]	[0.214]	[0.185]	[0.054]	[0.198]	[0.365]	[0.052]	[0.001]	[0.000]	[0.005]
TMT social capital >Tobin's Q	-	-	-	-	-	-	-	-	-	0.136	0.146	0.113
										[0.004]	[0.001]	[0.008]
TMT social capital >Z-score	-	-	-	-	-	-	-	-	-	0.287	0.389	0.218
										[0.004]	[0.002]	[0.009]
Efficiency >Z-score	0.037	0.102	0.184	0.037	0.206	0.109	0.085	0.105	0.135	0.129	0.158	0.162
	[0.665]	[0.103]	[0.051]	[0.677]	[0.007]	[0.003]	[0.006]	[0.345]	[0.049]	[0.007]	[0.005]	[0.004]
Leverage >Z-score	-0.215	-0.202	-0.123	-0.217	-0.106	-0.126	-0.120	-0.178	-0.387	-0.135	-0.210	-0.246
	[0.001]	[0.000]	[0.006]	[0.006]	[0.000]	[0.000]	[0.004]	[0.000]	[0.003]	[0.007]	[0.003]	[0.000]
Liquidity >Z-score	0.460	0.411	0.233	0.460	0.365	0.231	0.226	0.462	0.278	0.327	0.455	0.351
	[0.002]	[0.032]	[0.005]	[0.054]	[0.001]	[0.002]	[0.000]	[0.000]	[0.005]	[0.000]	[0.000]	[0.000]
Profitability >Z-score	0.245	0.304	0.288	0.245	0.340	0.334	0.339	0.243	0.199	0.305	0.302	0.397
	[0.000]	[0.000]	[0.000]	[0.001]	[0.005]	[0.005]	[0.009]	[0.009]	[0.000]	[0.000]	[0.000]	[0.000]
Z-score >Tobin's Q	0.769	0.735	0.624	0.769	0.631	0.547	0.619	0.770	0.460	0.630	0.617	0.703
	[0.000]	[0.000]	[0.000]	[0.000]	[0.002]	[0.001]	[0.000]	[0.000]	[0.003]	[0.000]	[0.000]	[0.000]
Adjusted R²:												
Z-score	0.413	0.495	0.478	0.413	0.357	0.411	0.202	0.397	0.751	0.698	0.729	0.712
Tobin's Q	0.644	0.666	0.596	0.644	0.554	0.543	0.499	0.646	0.754	0.603	0.688	0.697

Notes. The figures in the brackets are the *p*-values. Model (1) considers the general definitions *TMT education* and *TMT experience*. Model (2) adds *TMT innovativeness* to model (1). Model (3) excludes *TMT experience* but includes *TMT risk preference*. Model (4) uses *Supervisory experience* for *TMT experience* and excludes *TMT risk preference*. Model (5) uses *Industry-specific experience* to proxy for *TMT experience*. Model (6) uses *Firm-specific experience* to proxy for *TMT experience*. Model (7) uses *Academic education* to proxy for *TMT education*. Model (8) uses *Professional education* to proxy for *TMT education*. Model (9) controls for *Firm age* and include all core indicators. Model (10) (11) (12) uses *Elite academic (Oxbridge) (Two elites)* to proxy for *TMT social capital*, respectively. In models (10) to (12), *Firm-specific experience* is used to proxy for *TMT experience*. See Table 1 for the definition of the variables. The HTMT criteria are reported in the Appendix.

Table 2. 9 HTMT results - discriminant validity test of variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
TMT education>Tobin's Q	0.276	0.197	0.152	0.192	0.171	0.187	0.130	0.276	0.106	-	-	-
	[0.015]	[0.094]	[0.014]	[0.095]	[0.000]	[0.007]	[0.005]	[0.049]	[0.126]			
TMT education> Z-score	0.245	0.202	0.143	0.236	0.133	0.146	0.128	0.245	0.130	-	-	-
	[0.024]	[0.102]	[0.006]	[0.683]	[0.002]	[0.006]	[0.016]	[0.035]	[0.113]			
TMT experience>Tobin's Q	0.576	0.517	-	0.098	0.492	0.178	-	-	0.098	0.088	0.156	0.207
	[0.031]	[0.000]		[0.025]	[0.000]	[0.001]			[0.006]	[0.025]	[0.006]	[0.000]
TMT experience> Z-score	0.202	0.528	-	0.492	0.105	0.096	-	-	0.138	0.077	0.236	0.248
	[0.001]	[0.000]		[0.000]	[0.000]	[0.000]			[0.000]	[0.004]	[0.001]	[0.000]
TMT strategic cognition>Z-score	0.077	0.116	0.225	0.128	0.117	0.119	0.105	0.117	0.056	0.098	0.089	0.093
	[0.086]	[0.061]	[0.058]	[0.097]	[0.000]	[0.000]	[0.008]	[0.088]	[0.049]	[0.003]	[0.028]	[0.008]
TMT strategic cognition>Tobin's Q	0.203	0.187	0.165	0.118	0.372	0.367	0.345	0.664	0.274	0.135	0.147	0.165
	[0.016]	[0.004]	[0.000]	[0.000]	[0.000]	[0.000]	[0.012]	[0.000]	[0.000]	[0.018]	[0.002]	[0.001]
TMT innovativeness >Tobin's Q	-	0.166	0.165	0.086	0.083	0.107	0.032	0.664	0.165	0.165	0.305	0.237
		[0.005]	[0.009]	[0.587]	[0.004]	[0.000]	[0.144]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
TMT innovativeness >Z-score	-	0.341	0.225	0.104	0.132	0.178	0.023	0.598	0.038	0.138	0.223	0.132
		[0.001]	[0.000]	[0.314]	[0.118]	[0.004]	[0.248]	[0.000]	[0.088]	[0.009]	[0.000]	[0.004]
TMT risk preference> Tobin's Q	-	-	0.140	-	-	-	0.045	0.211	0.231	0.262	0.247	0.287
			[0.000]				[0.385]	[0.001]	[0.000]	[0.001]	[0.002]	[0.000]
TMT risk preference> Z-score	-	-	0.069	-	-	-	0.023	0.107	0.131	0.301	0.267	0.316
			[0.019]				[0.254]	[0.062]	[0.000]	[0.000]	[0.000]	[0.000]
TMT social capital >Tobin's Q	-	-	-	-	-	-	-	-	-	0.218	0.197	0.213
										[0.003]	[0.010]	[0.007]
TMT social capital >Z-score	-	-	-	-	-	-	-	-	-	0.197	0.182	0.203
										[0.009]	[0.010]	[0.000]
Efficiency > Z-score	0.570	0.122	0.024	0.128	0.149	0.147	0.132	0.218	0.081	0.261	0.214	0.232
	[0.046]	[0.024]	[0.039]	[0.177]	[0.000]	[0.000]	[0.000]	[0.049]	[0.002]	[0.000]	[0.003]	[0.000]
Leverage>Z-score	0.298	0.287	0.175	0.063	0.147	0.131	0.146	0.298	0.046	0.145	0.290	0.260
	[0.000]	[0.000]	[0.000]	[0.197]	[0.006]	[0.000]	[0.006]	[0.000]	[0.022]	[0.000]	[0.000]	[0.001]
Liquidity> Z-score	0.499	0.486	0.266	0.483	0.241	0.241	0.239	0.462	0.040	0.067	0.314	0.392
	[0.024]	[0.009]	[0.005]	[0.000]	[0.006]	[0.006]	[0.001]	[0.000]	[0.059]	[0.037]	[0.000]	[0.000]
Profitability> Z-score	0.266	0.291	0.275	0.289	0.339	0.339	0.337	0.266	0.482	0.267	0.304	0.274
	[0.000]	[0.000]	[0.000]	[0.012]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.009]	[0.000]	[0.002]
Z-score>Tobin's Q	0.785	0.795	0.652	0.789	0.589	0.597	0.650	0.785	0.661	0.645	0.645	0.671
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Adjusted R^2 for Z-score	0.413	0.495	0.478	0.413	0.357	0.411	0.202	0.397	0.726	0.698	0.729	0.712
Adjusted R^2 for Tobin's Q	0.644	0.666	0.596	0.644	0.554	0.543	0.499	0.646	0.732	0.603	0.688	0.697

Notes: This tables reports the HTMT criteria that measure the correlations among constructs or indicators. The figures in the brackets are the *p*-values showing the statistical significance of the correlations. See Table 1 for the definition of the variables.

2.19 TMT strategic cognition PLS-SEM results

Figures 2.12- 2.16 show PLS output results for selected models (model 3, 6, 9) which higlighted key significant findings in this study. These output results are the modified version of model 3, 6 and 9 Table 2.8 PLS results with their respective HTMT results. The results below show how different combinations of TMTSC elements can impact differently on financial health and firm value.

2.19.1 Effects of R&D spending and risk preference on outcomes-PLS results
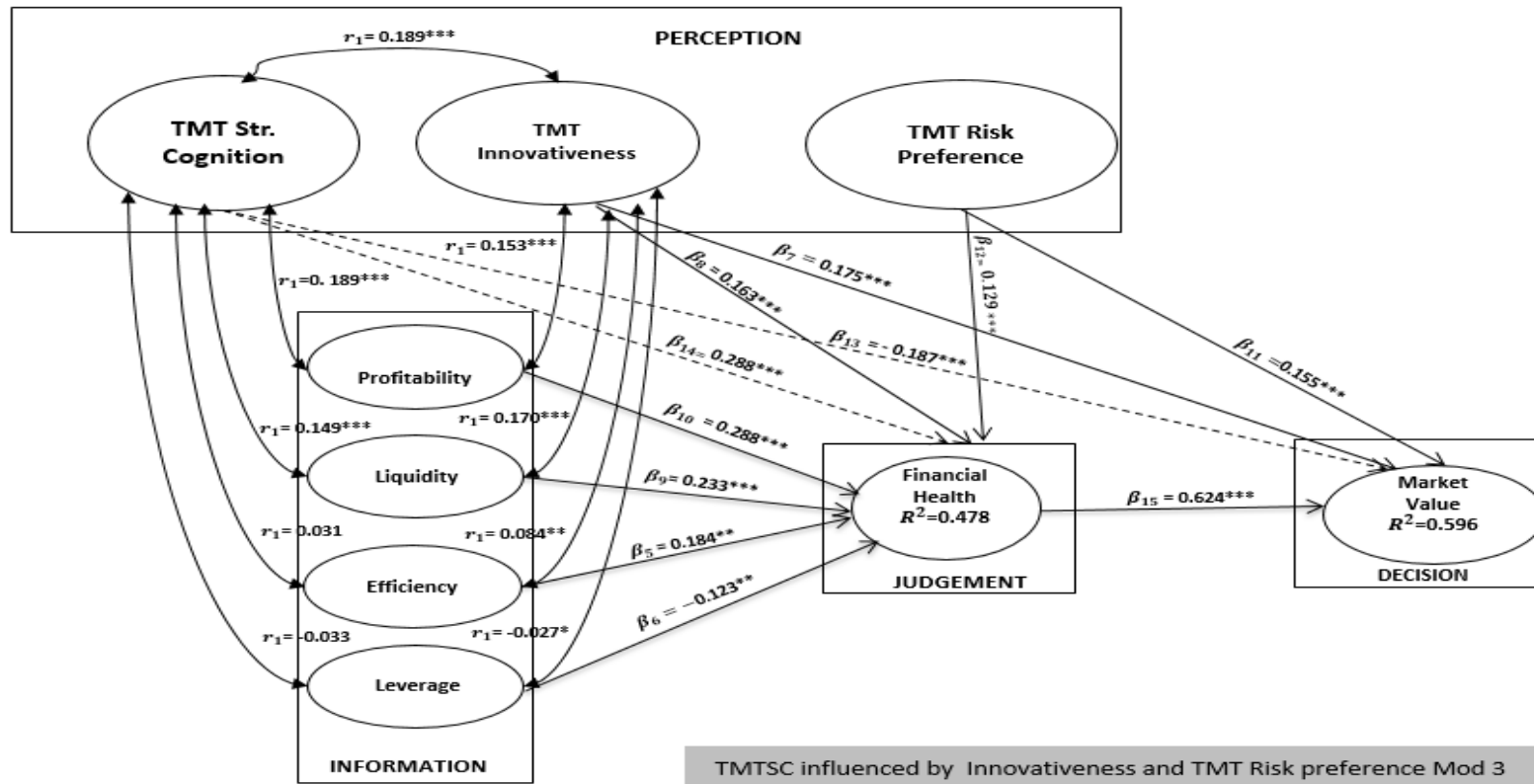
Figure 2. 12 PLS result R&D spending and TMT risk preference on outcomes

2.19.2 Effects of firm specific experience and TMT education on outcomes
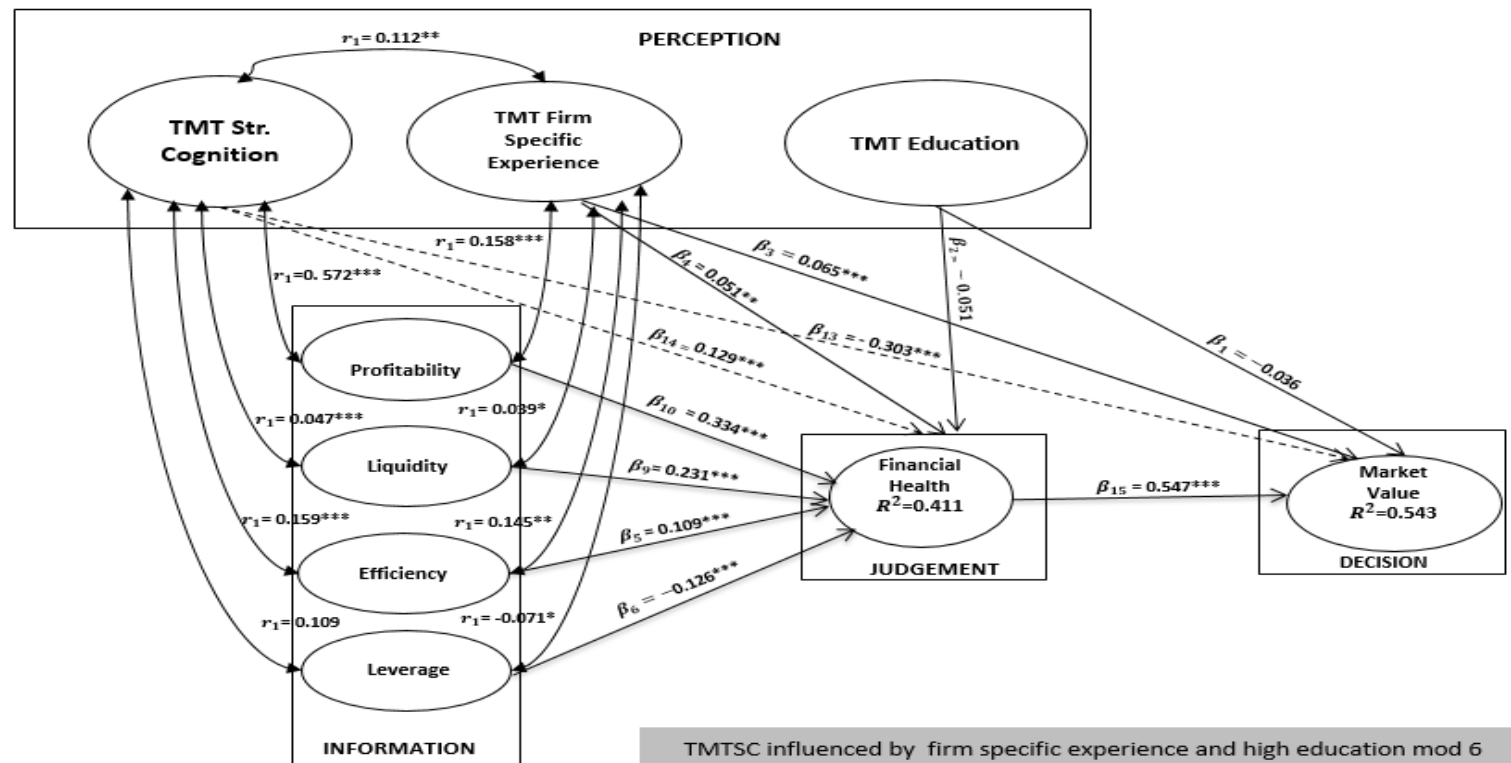
Figure 2. 13 PLS results -effects of firm's specific experience and education on outcome

2.19.3 Effects of education, R&D spending, risk preference and experience on outcomes
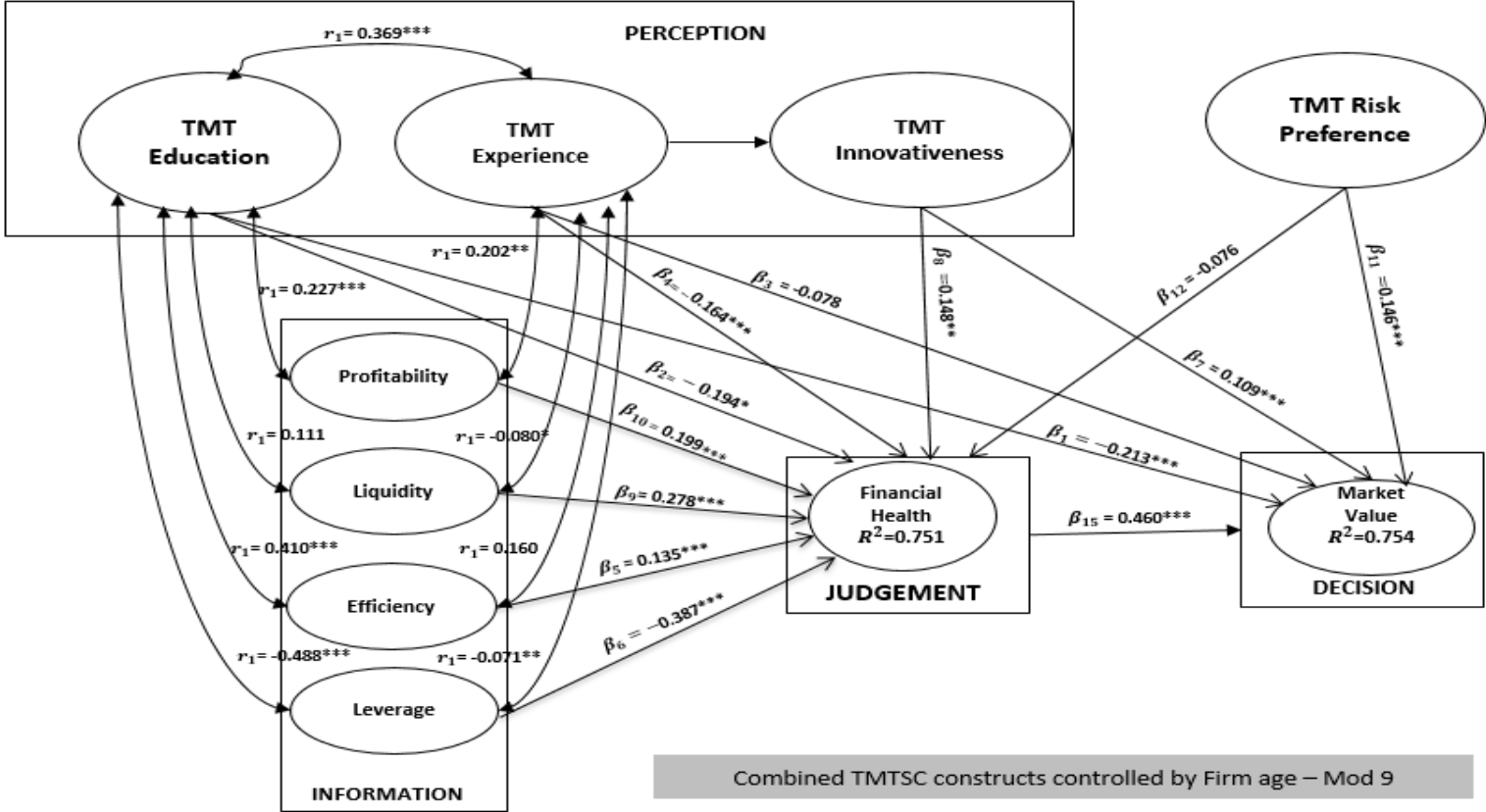
Figure 2. 14 PLS results Effects of education, R&D spending and experience on outcomes

2.20 Discussions and findings

Table 2.8 reports the PLS-SEM results for my throughput decision making model. Agency theory implies that managers tend to be more risk averse than investors because their reputation and economic wherewithal are tied to their firms (Eisenhardt, 1989). Equations for my first two models and results are given below;

Model 1 I examined TMT education, experience and TMT strategic cognition on firma value

$$Tobin'sQ_{it} = \alpha_{it} + \beta_1 TMTeducation + \beta_2 TMTexperience_{it} + \beta_3 TMTSC_{it} + \beta_4 Profitability\ ratio_{it} + \beta_5\ Efficiency\ ratio_{it} + \beta_6 Leverage_{it} + \beta_7\ Liquidity\ ratio_{it} + \varepsilon_{it}$$

Model 2 I included TMT innovativeness into model 1 and examined their effects on firm value

$$Tobin'sQ_{it} = \alpha_{it} + \beta_1 TMTeducation + \beta_2 TMTexperience_{it} + \beta_3 TMTinnovativeness_{it} + +\beta_4 TMTSC_{it} + \beta_5 Profitability\ ratio_{it} + \beta_6\ Efficiency\ ratio_{it} + \beta_7 Leverage_{it} + \beta_8\ Liquidity\ ratio_{it} + \varepsilon_{it}$$

Model (1) indicates that *TMT education* contributes negatively to the financial health (β = -0.160, p = 0.038) but not to the market value of the UK firms (β = -0.007, p = 0.923). Similarly, *TMT experience* contributes negatively to the financial health (β = -0.202, p < 0.001) but not to firm value (β = -0.048, p = 0.495). Yet, *TMT strategic cognition* does not exert any strong influence on these outcomes, noting though that the *p*-values are 0.103 (β = 0.084) and 0.101 (β = 0.066) for *Z-score* and *Tobin's Q*, respectively. These are salient findings as one would expect that TMT members' education and experience would influence their strategic cognition. The results imply that TMT members with higher education and experience have already built a distinctive legacy and reputation therefore, they are usually less motivated to take higher risk (Barker III & Mueller, 2002; Finkelstein et al., 2009; Berger et al., 2014). Further, highly educated TMT's are mostly

older executives and older executives are usually risk averse (Graham et al., 2013; Berger et al., 2014; Heyden et al., 2017). This results is consistent with Berger *et al*. (2014) who posit that the presence of higher educated TMT on the board is associated with lower risk taking which can have a negative impact on firm performance. Overall, model 1 results support hypotheses 1b and 2b only. My findings are parallel to the notion that highly educated TMT with higher experience are usually risk adverse and their lack of preparedness to take high risk during strategic cognition will ultimately have negative effect on firm performance.

The coefficient of determination (R^2) for this model is 0.413 and 0.644 for financial health and firm value, respectively. Regarding the other findings, financial health improves market value of the firms and also companies with higher liquidity, higher profitability and lower leverage have better financial health. In what follows, my discussion regarding the implications of the results focuses on whether I support out hypotheses.

In model (2) I consider TMT innovativeness levels on top of education background and experience of TMT members. I observe that *TMT strategic cognition* in this case has a significant and positive impact on financial health ($\beta = 0.164$, $p < 0.001$) and firm value ($\beta = 0.182$, $p < 0.001$), which corroborates my hypotheses 3a and 3b. Furthermore, I report significant and positive effects of *TMT innovativeness* on financial health ($\beta = 0.234$, $p < 0.001$) and firm value ($\beta = 0.110$, $p = 0.003$), which confirms my hypotheses 5a and 5b.

Equations for Model 3-6 and results are given below examine TMT-SC effects on firm value and corporate financial performance. Model 1 and 2 examine the implications of TMT's background education on TMT-SC. Models 3 and 4 investigate the effects of TMT risk appetite and TMT innovativeness on TMT-SC and firm value respectively. Models 4, 5 and 6 explore the implications of TMT relevant experience (supervisory or general experience, industry specific experience and firm specific experience respectively) on TMT-SC and firm value. Models 7 and 8 examine the effects of combining TMT innovativeness and TMT risk preference on TMT-SC and firm value. Model 9 controls for the age of firms used in our dataset. And models 10-12 further examine the implications of social capital (different network groups and relationships) on TMT-SC and firm value.

The variables included/excluded in each model are detailed in the equations below;

Model 3 I excluded TMT experience from model 2 in order to examine TMT strategic cognition, TMT risk preference and TMT innovativeness effects on firm value

$$Tobin'sQ_{it} = \alpha_{it} + \beta_1 TMTeducation + \beta_2 TMTSC_{it} + \beta_3 TMT\ innovativeness_{it} + \beta_4 TMT\ Riskpreference_{it} + \beta_5\ Profitability\ ratio_{it} + \beta_6\ Efficiency\ ratio_{it} + \beta_7\ Leverage_{it} + \beta_8\ Liquidity\ ratio_{it} + \varepsilon_{it} \qquad (3)$$

In model 4-6, I further examined in detail TMT general experience, TMT industry specific experience and TMT firm specific experience effects on firm value

Model 4 (I included TMT general experience but excluded TMT risk preference to examine their effects on firm value

$$Tobin'sQ_{it} = \alpha_{it} + \beta_1 TMTeducation + \beta_2 TMTGeneral\ experience_{it} + \beta_3\ TMTSC_{it} + \beta_4 TMT\ innovativeness_{it} + \beta_5\ Profitability\ ratio_{it} + \beta_6\ Efficiency\ ratio_{it} + \beta_7\ Leverage_{it} + \beta_8\ Liquidity\ ratio_{it} + \varepsilon_{it} \qquad (4)$$

Model 5 I substituted TMT industry specific experience with general experience to examine their effects on firm value.

$$Tobin'sQ_{it} = \alpha_{it} + \beta_1 TMTeducation + \beta_2 TMTindustry\ experience_{it} + \beta_3\ TMTSC_{it} + \beta_4 TMT\ innovativeness_{it} + \beta_5\ Profitability\ ratio_{it} + \beta_6\ Efficiency\ ratio_{it} + \beta_7\ Leverage_{it} + \beta_8\ Liquidity\ ratio_{it} + \varepsilon_{it} \qquad (5)$$

Model 6 I substituted TMT industry specific experience with TMT firm specific experience to examine their effects on firm value

$$Tobin'sQ_{it} = \alpha_{it} + \beta_1 \, TMTeducation + \beta_2 \, TMTfirm\ experience_{it} + \beta_3 \, TMTSC_{it} + \beta_4 TMT\ innovativeness_{it} + \beta_5 \, Profitability\ ratio_{it} + \beta_6 \, Efficiency\ ratio_{it} + \beta_7 \, Leverage_{it} + \beta_8 \, Liquidity\ ratio_{it} + \varepsilon_{it} \qquad (6)$$

In model (3) I consider TMT risk appetite additional to education background and innovativeness of TMT members but exclude TMT general experience. Regarding the risk taking attitude of managers, I obtain significant and positive effects of *TMT risk preference* on *Tobin's Q* ($\beta = 0.155$, $p = 0.003$) and *Z-score* ($\beta = 0.129$, $p = 0.004$). This set of results lends support to my hypotheses 4a and 4b. Similar to the case in model (2), I again observe that *TMT strategic cognition* has a significant and positive effect on financial health ($\beta = 0.288$, $p < 0.001$) and firm value ($\beta = 0.187$, $p = 0.002$). It should be noted that these effects are stronger in magnitude when compared to the results in models (1) and (2). The logic behind these stronger effects could be attributed to the more effective role of strategic cognition when it is considered together with innovativeness and risk appetite of executives, which affirms previous studies that suggest that greater education leads to greater innovation because higher level of education improve cognitive processing and problem-solving ability of individuals (Kimberly & Evanisko, 1981).

It seems that managers who place high bet in risky investment by spending more on R&D tend to lead to significant effects on corporate value and TMT are prepared to consider more investment opportunities when the share price of their firm increases (Sanders & Hambrick, 2007). The throughput version of this model is reported in Figure A1.

Model (4) examines particularly the effects of TMT-SC on firm value and financial health. In this TMT-SC model we test for TMT relevant supervisory experience on outcomes. My hypothesis 2a and 2b is confirmed as the impact of this TMT-SC on *firm value* is significant and positive ($\beta = 0.084$, $p < 0.011$). The positive impacts of *TMT*

strategic cognition on both financial health and firm value show that relevant TMT experience is crucial for TMT strategic decision making process. My results related to experience are consistent with the theory of learning transfer which implies that transfer of experience from one context to a dissimilar context can produce a negative result (i.e., previous supervisory experience can be too general or irrelevant). This is valid especially when organizations are unique in terms of their culture, norms and practices: My negative finding is eminent when knowledge that is acquired from prior experience conflicts with the existing norms and operational standards of the new firm (Hamori, 2015).

Model (5) focuses on the effects of TMT industry-specific experience on firm value and financial health (i.e., *TMT experience* is represented by *Industry-specific experience*). I observe that TMT-SC that prioritise relevant *TMT industry experience* has a significant and positive association with firm value ($\beta = 0.062$, $p = 0.049$). These results again confirm hypothesis 2b that states that TMT-SC on firm value increases with relevant TMT experience (industry-specific experience). Thus, the positive association between TMT-SC and firm value increased significantly from ($\beta = 0.066$, $p = 0.103$) to ($\beta = 0.160$, $p = 0.002$) as result of the relevant TMT industry specific experience. This results is consistent with previous studies that argue that TMT's with relevant industry-specific experience is a valuable human capital to firms because they can bring goodwill and ties with key industry players and access to superior information (Kor & Misangyi, 2008). Also, the results in module 5 show that TMT-SC that involves high industry specific experience firm cab result to high TMT innovativeness ($\beta = 0.072$, $p = 0.008$). This findings confirms hypothesis 3a. which is consistent with previous studies that posit that experience TMT's who prioritise R&D in their firms mostly achieve competitive advantage and better outcomes (Kor, 2006).

Model (6) examines the effects of TMT firm-specific experience on firm value and financial health (i.e., *TMT experience* is represented by *Firm-specific experience*). The results from model 6 shows that the positive effects of TMT-SC on firm value and corporate financial health increases with relevant TMT firm specific experience ($\beta = 0.065$, $p = 0.003$) and financial health ($\beta = 0.051$, $p = 0.051$). Further the positive association between TMT-SC and firm value increased significantly from ($\beta = 0.066$, $p = 0.103$). to ($\beta = 0.303$, $p = 0.000$). Superior TMT-SC associated with relevant TMT firm specific experience provided a further boost to TMT innovativeness and outcomes ($\beta = 0.103$, $p = 0.007$). The findings from model 6 confirm hypotheses 1a, 1b, 2a, 2c, 3b and 3d

Above results are consistent with Kor and Misangyi (2008) who state that TMT's with firm-specific experience provide invaluable source of assets to most firms due to their rare, valuable, inimitable, idiosyncratic skills acquired through organisational learnings over the years. Thus the richness of their experience provides innovate ideas that can provide competitive advantage to their firms.

In model (7) *TMT education* is based on academic qualifications whereas in model (8) it is based on professional qualifications. In both models, the results show that *TMT-SC that prioritise education* either has no or little influence on outcomes ($\beta = -0.18$, $p < 0.413$).[viii]

In model 7 and 8 I examined the effects of combining TMT general and professional education with TMT innovativeness and risk preference to further test hypothesis 3 (3a-3d) by using the model in equation 7 and 8

Model 7
$$Tobin's Q_{it} = \alpha_{it} + \beta_1\, TMT\ general\ education + {} + \beta_2\, TMTSC + {}$$
$$\beta_3\, TMTinnovativeness_{it} + \beta_4 TMT\ Riskpreference_{it} + \beta_5 Profitability\ ratio_{it} + {}$$
$$\beta_6\ Efficiency\ ratio_{it} + \beta_7\, Leverage_{it} + \beta_8\ Liquidity\ ratio_{it} + \varepsilon_{it} \qquad (7)$$

Model 8

$$Tobin'sQ_{it} = \alpha_{it} + \beta_1\,TMT\,professional\,education + +\beta_2\,TMTSC +$$
$$\beta_3\,TMTinnovativeness_{it} + \beta_4 TMT\,Riskpreference_{it} + \beta_5 Profitability\,ratio_{it} +$$
$$\beta_6\;Efficiency\,ratio_{it} + \beta_7\,Leverage_{it} + \beta_8\;Liquidity\,ratio_{it} + \varepsilon_{it} \qquad (8)$$

In model 9 I control for the difference in the age of the firms in my dataset

$$Tobin'sQ_{it} = \alpha_{it} + \beta_1\,TMTeducation + \beta_2\,TMTexperience_{it} +$$
$$\beta_3\,TMTinnovativeness_{it} + \beta_4 TMT\,Riskpreference_{it} + \beta_5\,Elite\,university\,networks_{it} +$$
$$\beta_6\,Profitability\,ratio_{it} + \beta_7\;Efficiency\,ratio_{it} + \beta_8\,Leverage_{it} +$$
$$\beta_9\;Liquidity\,ratio_{it} + ControlVar + \varepsilon_{it} \qquad (9)$$

In model 10 – 12 I examined the effects of different network groups on TMT strategic cognition and firm performance

Model 10

$$Tobin'sQ_{it} = \alpha_{it} + \beta_1\,TMTexperience_{it} + \beta_2\,TMTSC_{it} +$$
$$+\beta_3\,TMTinnovativeness_{it} + \beta_4 TMT\,Riskpreference_{it} +$$
$$\beta_5\,elite\,university\,networks_{it} + \beta_6\,Profitability\,ratio_{it} +$$
$$\beta_7\;Efficiency\,ratio_{it} + \beta_8\,Leverage_{it} + \beta_9\;Liquidity\,ratio_{it} + \varepsilon_{it} \quad (10)$$

Model 11

$$Tobin'sQ_{it} = \alpha_{it} + \beta_1\,TMTexperience_{it} + \beta_2\,TMTSC_{it} +$$
$$+\beta_3\,TMTinnovativeness_{it} + \beta_4 TMT\,Riskpreference_{it} +$$
$$\beta_5\,Oxbridge\,networks_{it} + \beta_6\,Profitability\,ratio_{it} + \beta_7\;Efficiency\,ratio_{it} +$$
$$\beta_8\,Leverage_{it} + \beta_9\;Liquidity\,ratio_{it} + \varepsilon_{it} \qquad (11)$$

In model (9), using the general definitions related to education and experience, I control

for the age of firms in order to examine its effects on my results. The results show that

even in older firms the positive association between TMT-SC and firm value is stronger

($\beta = 0.190$, $p = 0.000$). Further, the results in model 9 shows that the positive effects of

TMT-SC on firm value increases with *TMT innovativeness* ($\beta = 0.109$, $p = 0.006$). The

above two results confirm hypothesis 1a, 1b 3b and 3d.

Models 10) to 12 examine effects of social capital (network and relationships) on TMT-

SC and firm outcomes.

Following D'Aveni 1990, we use Times higher education world ranking THE 2017 to explore the elite social capital background of all TMT's on our dataset, Thus in model (10), I consider whether TMT have any degrees from the top 100 universities in the world (according to Times higher education world ranking 2017) and use result as proxy to for *TMT social capital*. In model (11), we use Oxbridge as proxy for *TMT social capital*. (Thus 1 if TMT have either Cambridge or Oxford education background otherwise 0) In model (12), we use a combination of elite professional education and elite university to construct Elite *TMT social capital* (thus if TMT has elite professional qualification-*see variable description* plus qualification from any of the top 100 universities in the world 1 otherwise 0).

The results in model 10 – 12 shows that, the positive effects of TMT-SC on firm value increases with TMT-SC social capital. For example results in model 10 shows a significant positive association between TMT-SC and firm value ($\beta = 0.078$, $p = 0.009$). Also, I noticed a significant positive association between TMT-SC and corporate financial health ($\beta = 0.183$, $p = 0.009$). These results confirm hypothesis 4a and 4b.

The significant implications of social capital on TMT-SC were further confirmed as part of robustness in models 11 and 12. The results in models 11-12 show that the positive effects of TMT-SC on firm value with increase in TMT social capital ($\beta = 0.089$, $p = 0.007$; $\beta = 0.113$, $p = 0.000$).

Results from models 10-12 are consistent with previous studies that show that social capital and networking are embedded with superior industry information that can provide firms with valuable results including promoting innovativeness (Watson, 2007; Gronum, 2012). Moreover, some scholars argue that managers usually seek economic resource from their 'peers' in their network as a means to fund new project or start new business initiatives (Chua & Pan, 2008).

2.20.1 The effects of past corporate value and performance on TMTSC

2.20.1.1 The effects of previous financial health and firm value on TMT attributes

As part of robustness, I followed Rodgers *et al*. (2013) to test for possible of causalities problems in my models by lagging the results. I examined further whether current levels of strategic cognition, innovativeness and risk preferences of TMT members are influenced by the preceding year's financial health and firm value. My motivation for conducting such analyses is further derived from (Schuler & Cording) who posit that- to fully explain the link between decision making process and performance- all possible linkage effects should be explored. The PLS results of my analyses are reported in Table 2.10.

Table 2. 10 testing for causalities-lagged effects

	Panel A PLS results			Panel B HTMT results		
	(1)	(2)	(3)	(1')	(2')	(3')
Lagged Z-score> TMT strategic cognition	0.184	-	-	0.262	-	-
	[0.000]	-	-	[0.000]	-	-
Lagged Tobin's Q> TMT strategic cognition	0.109	-	-	0.440	-	-
	[0.000]			[0.000]		
Lagged Z-score> TMT risk preference	-	0.067	-	-	0.094	-
	-	[0.011]	-	-	[0.050]	-
Lagged Tobin's Q> TMT risk preference	-	-0.108	-	-	0.109	-
	-	[0.011]	-	-	[0.023]	-
Lagged Z-score> TMT innovativeness	-	-	0.098	-	-	0.092
	-	-	[0.053]	-	-	[0.053]
Lagged Tobin's Q> TMT innovativeness	-	-	0.173	-	-	0.093
	-	-	[0.004]	-	-	[0.051]
Lagged Efficiency > Lagged Z-score	0.164	0.159	0.183	0.158	0.151	0.205
	[0.002]	[0.000]	[0.000]	[0.002]	[0.000]	[0.000]
Lagged Leverage> Lagged Z-score	-0.198	-0.161	-0.125	0.131	0.128	0.141
	[0.000]	[0.004]	[0.007]	[0.004]	[0.005]	[0.002]
Lagged Liquidity> Lagged Z-score	0.248	0.234	0.264	0.240	0.223	0.270
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Lagged Profitability> Lagged Z-score	0.318	0.294	0.354	0.314	0.294	0.368
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Lagged Z-score> Lagged Tobin's Q	0.452	0.683	0.681	0.693	0.683	0.681
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Adjusted R²:						
TMT strategic cognition	0.315			0.314		
TMT risk preference		0.169			0.146	
TMT innovativeness			0.209			0.213

Notes. The figures in the brackets are the *p*-values in both panels; panel A (B) reports OLS (HTMT) results. Model (1) examines the impact of lagged firm financial health and firm value on *TMT strategic cognition*. Model (2) examines the impact of lagged financial health and firm value on *TMT risk preference*. Model (3) examines the impact of lagged financial health and firm value on *TMT innovativeness*. In panel B, the HTMT criteria measure the correlations among constructs or indicators: the *p*-values show the statistical significance of the correlations. See Table 1 for the definition of the variables.

Model 1 shows lagged TMT Strategic cognition to examined effects on firm value

$$Tobin'sQ_{it} = \alpha_{it} + \beta_1\, laggedTMTSC + \beta_4\, laggedProfitability\, ratio_{it} +$$
$$\beta_5\, laggedEfficiency\, ratio_{it} + \beta_6\, laggedLeverage_{it} +$$
$$\beta_7\, laggedLiquidity\, ratio_{it} + \varepsilon_{it} \qquad\qquad (1^*)$$

Model 2 shows lagged TMT risk preference to examined effects on firm value

$$Tobin'sQ_{it} = \alpha_{it} + \beta_1\, laggedTMTriskpreference +$$
$$\beta_4\, laggedProfitability\, ratio_{it} + \beta_5\, laggedEfficiency\, ratio_{it} +$$
$$\beta_6\, laggedLeverage_{it} + \beta_7\, laggedLiquidity\, ratio_{it} + \varepsilon_{it} \qquad (2^*)$$

Model 3 shows lagged TMT innovativeness to examined effects on firm value

$$Tobin'sQ_{it} = \alpha_{it} + \beta_1\, laggedTMTinnovativeness +$$
$$\beta_4\, laggedProfitability\, ratio_{it} + \beta_5\, laggedEfficiency\, ratio_{it} +$$
$$\beta_6\, laggedLeverage_{it} + \beta_7\, laggedLiquidity\, ratio_{it} + \varepsilon_{it} \qquad (3^*)$$

Figure 2.15- 2.17 show PLS output results that examines the impact of the lagged firm financial health and firm value on TMT strategic cognition.

2.20.1.2 Lagged financial health and firm value on TMTSC
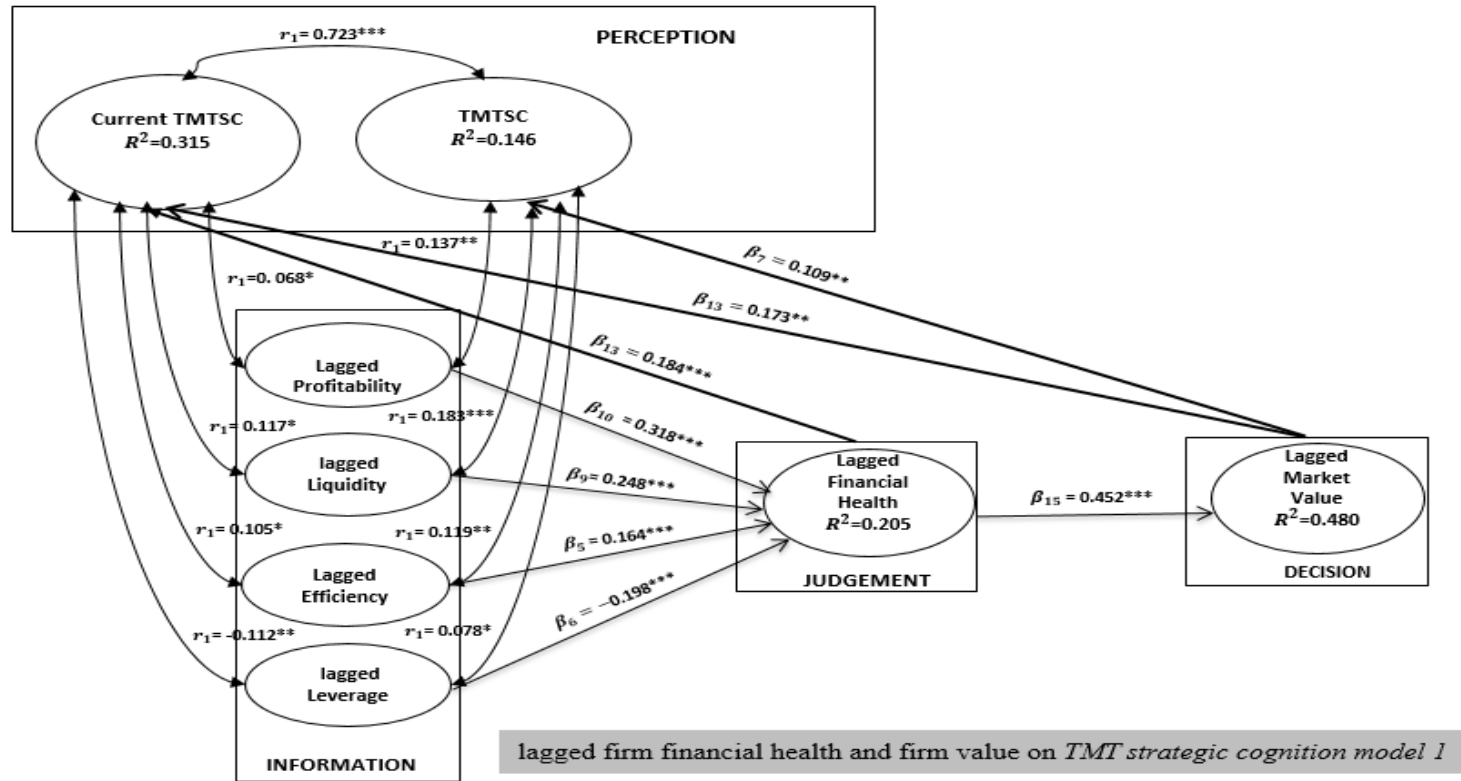
Figure 2. 15 PLS results on effect of lagged financial health and firm value effect on TMTSC

Model (1) shows that lagged *Z-score* (β = 0.184, $p < 0.001$) and lagged *Tobin's Q* (β = 0.109, $p < 0.001$) have significant and direct effects on current *TMT strategic cognition* (R^2=0.315). Similarly, lagged *Z-score* (β = 0.098, $p = 0.053$) and lagged *Tobin's Q* (β = 0.173, $p = 0.004$) have again significant and positive effects on current *TMT innovativeness* in model (3) (R^2=0.209). The results imply that TMT prioritize the market perception about their firms during strategic decision making process: they can systematically scan for technological trends by emphasizing innovativeness that can increase their market share as well as the corporate value in the stock market (Talke et al., 2011). Thus, in order to secure their position in the industry as well as in the minds and heart of their investors TMT can continue to invest in R&D to improve their financial health.

2.20.1.3 Lagged financial health and firm value on TMT risk preference.
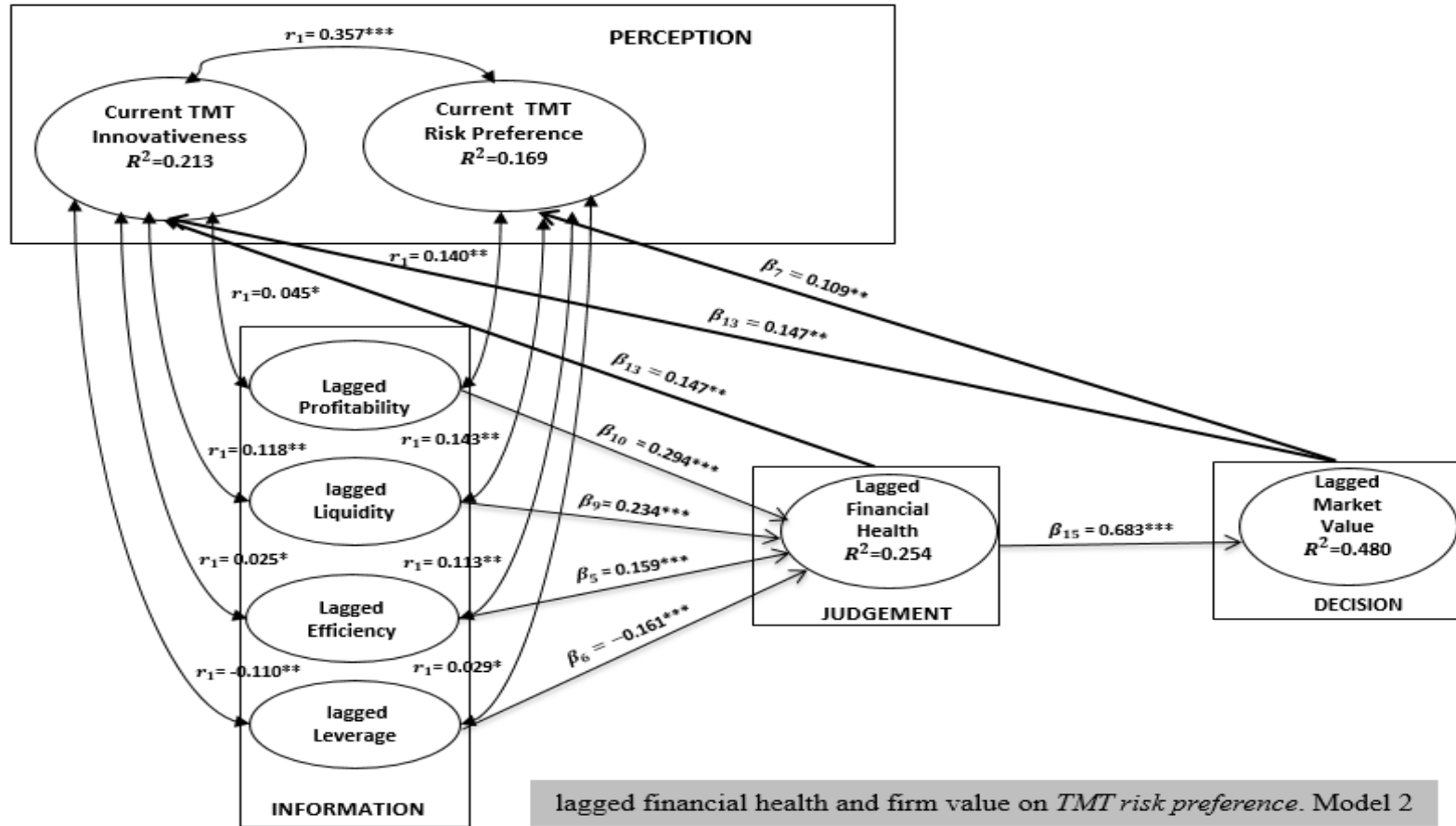
Figure 2. 16 PLS results on effect of lagged financial health and firm value on TMT risk preference

As for the executives' risk appetite in model (2), I report mixed results: the impact of lagged *Z-score* on *TMT risk preference* is significant and positive ($\beta = 0.067$, $p = 0.011$) whereas the impact of lagged *Tobin's Q* on *TMT risk preference* is significant but negative ($\beta = -0.108$, $p = 0.011$) ($R^2 = 0.169$). The inverse relationship between firm value and risk appetite can be possibly attributed to the disciplinary role of capital markets in the sense that declined market value of firms pushes TMT executives to take on risky but value-enhancing projects that would later increase market value. This line of reasoning is parallel to what I report in Table 2.8: the effect of contemporaneous *TMT risk preference* on *Tobin's Q* is generally significant and positive especially when high risk taking behaviour is supported by better quality academic and professional qualifications.

2.20.1.4 Lagged financial health and firm value on TMT innovativeness
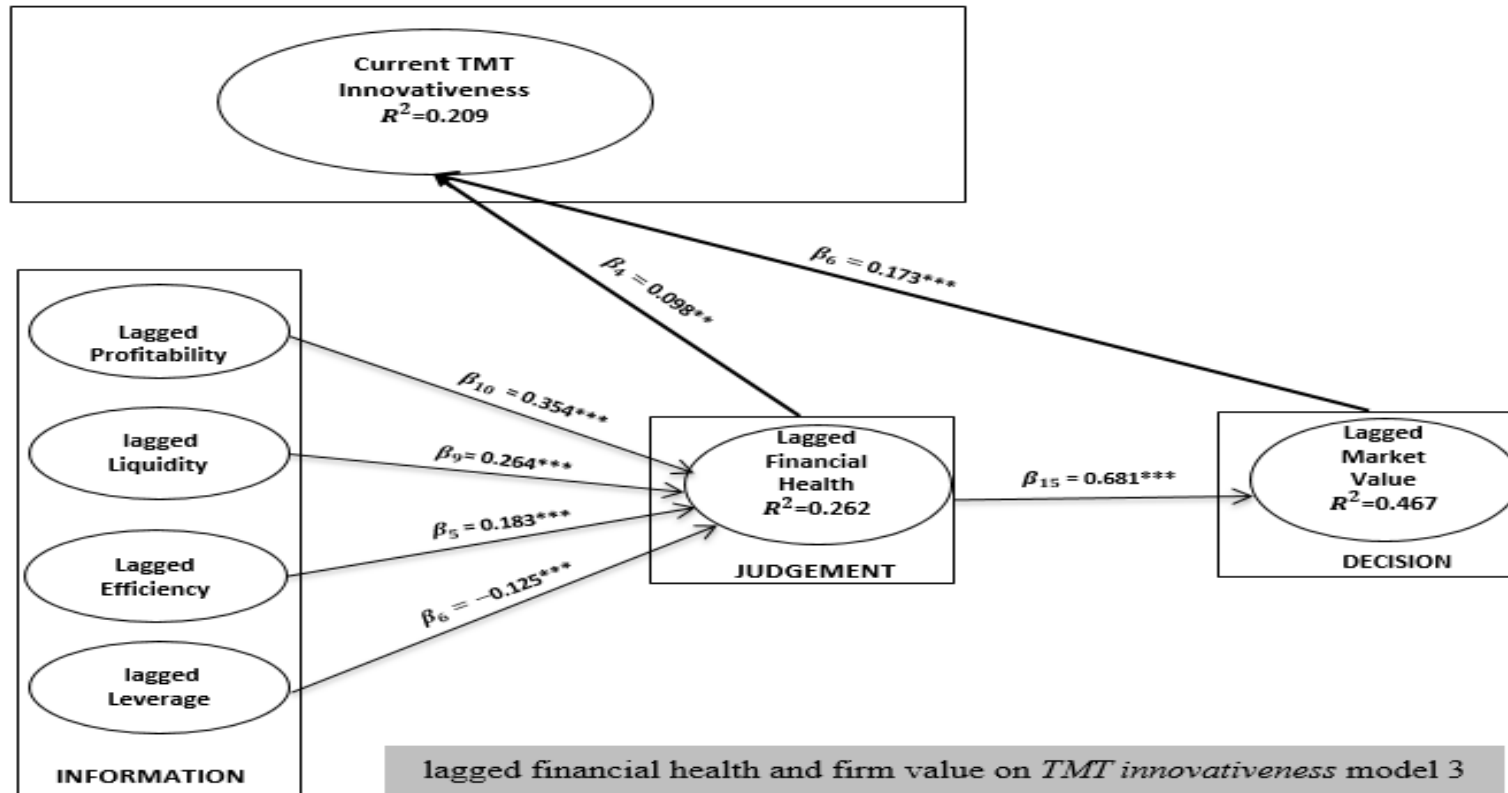
Figure 2. 17 PLS results on effect of lagged financial health and firm value on TMT innovativeness

2.21 Conclusion

This study in this chapter synthesized the theoretical arguments related to cognitive abilities of top corporate executives and examined empirically to what extent such managerial characteristics exert influence on financial health and value of UK listed firms. This study is one of the first that combines four different TMT strategic cognition constructs (education background, experience, innovativeness and risk preferences) all in one study to measure TMT strategic cognition and how it affects firm outcomes.

My PLS-SEM results based on firm-level panel data for the period 2008 to 2016 suggest that strategic cognition that gives priority to TMT education background alone does not provide significant contributions to corporate value or financial health. However, when education is combined with industry- or firm-specific experience, the strategic cognition of executives can lead to positive effect on corporate health and value. The positive contribution of strategic cognition is even more salient when TMT members increase their risk preferences by investing in more innovative ideas that can be observed from R&D activities (i.e., high risk appetite and high innovativeness). These findings are crucial to the recruitment and selection of employees for organizations as well as training and development arranged by human resources departments.

I noticed in my sample that most TMT members are partners to their professional bodies. As partners, they continue to develop their tacit knowledge and firm-specific skills which ultimately benefit the company. Further, partners mostly maintain close contacts with the top echelons of the professional bodies which give them access to extra cognitive skills that can be utilized during TMT strategic cognition process in the boardroom. My results suggest that networks are embedded with cognition-based trust because members in

aforementioned elite network benefits from superior knowledge resources and expertise advise about the industry in which the firm operates and firm-specific problem solving recommendations. As a reflection, my analyses show that such contacts and networks strengthen the positive association between strategic cognition and firm outcomes. They also strengthen the positive effects of firm-specific experience that already provides better contributions compared to general experience. Hence, the results show that the structure and content of elite network group can offer managers with superior information that can support TMT strategic cognition to produce positive significant outcomes. Similarly, the risk preference and innovativeness of TMT show stronger effects on financial health and market value of the firms when professional and academic qualifications from reputable institutions are considered together.

To ensure robustness, the results in this study also account for the reverse causality and examines the relationship between past performance of the firms in the market and their financial soundness. I find that current TMT characteristics including risk appetite and innovation capabilities as well as strategic cognition quality are sensitive to the previous levels of the firms' financial health and value. Namely, corporate managers can alter their risk appetite level and initiate projects with more innovative ideas if they notice that their firm is doing very well financially.

Overall, this study provides supporting evidence for the dynamic capability theory, the upper echelon theory as well as the resource-based and knowledge-based views. Future research can examine more methodically i) through which mechanism having social networking skills would help TMT contribute further to the financial performance of their firms, and ii) why academic education and general experience in isolation would be no good to corporate outcomes.

CHAPTER 3

Audit committee attributes and corporate outcomes during the global financial crisis and stable periods.

3.1 Introduction

This paper examines whether audit committee (AC) characteristics and corporate sustainability disclosure (CSD) positively impact corporate financial performance and firm value during and after the global financial crisis (GFC). Previous studies have examined the causes and effects of the GFC from the perspective of poor corporate governance (Gompers et al., 2003; Acharya & Richardson, 2009; Adams, 2012), lack of ethical leadership (Carson, 2003; Chen, 2010; Thakor, 2015), debt securitisation (Keys et al., 2010; Morales et al., 2014) and poor risk management culture (Aebi et al., 2012; Boz & Mendoza, 2014). I contribute to the literature by examining GFC from a completely different perspective, first, by examine further the causes of GFC from the perspective of the fraud triangle, earnings management and the six trust pathways. Second, by simultaneously examine corporate sustainability disclosure together with audit committee attributes in relation to corporate financial health and firm value during GFC and post GFC. As far as I am concerned, this study is the first empirical study that simultaneously investigates the effects of AC characteristics together with corporate sustainability disclosure on corporate financial health and firm value. Third this study show that during a period of economic uncertainties, firms rely on the expertise and experience of accounting finance experts for strategy formulation in comparison to during periods of economic stability. Fourth, this study is one of the first to provide empirical evidence (using PLS-SEM) to show that corporate sustainability disclosure is crucial for investor's decision making during periods of economic instability. Thus, firms that communicate their corporate sustainability frequently with investors, as well as have more accounting

finance experts on their AC, can produce better outcomes. Previous studies show that AC is the single most important board subcommittee (Aldamen et al., 2012) as a result of its unique oversight and monitoring role in protecting shareholders' investment (DeZoort *et al.*, 2002). The primary role of the AC is to oversee and monitor the firm financial reporting process, the review of annual financial reports, internal controls, and external and internal audit process and risk management practices in the firm (Klein 2002). The results from this study shows that the experience of the AC chair plays a significant role in securing a positive outcome during both periods of economic instability and economic stability. A strong, well-qualified and experienced AC chair is associated with a positive firm value. For example, the UK and the US corporate governance requires all listed firms to have at least one accounting certified financial expert on their AC. The results obtained from my data analysis show that most of the AC chairs of FTSE 350 companies are experienced well-qualified accounting certified financial experts.

Figure 3.1 below show the summary of this chapter. First, introduction to the study elaborates research problems, research objectives and contributions. Second, sections 3.5 provides detail background information about the causes and effects of the 2007/8 financial crisis. Third sections 3.6 identifies some of the key accounting irregularities and financial statement frauds during the 2007/8 financial crisis. Fourth, sections 3.7 and 3.8 provides theories that underpins the key accounting scandals during the 2007/8 financial crisis. Section 2.9 contributes to the accounting literature by relating fraud triangle and fraud diamond framework to the six trust pathways. Sections 3. 11 up to section 3.15 further examines UK cooperate governance structure and the role of the audit committee in the rule based and principle based corporate governance jurisdiction. Sections 3.17 and 3.18 used systematic literature to examine the effects of audit committee on earnings management. Sections 3.20 provides further contributions to the accounting literature by relating earnings management to the six trust positions. This particular sections provides

useful insights into the different positions fraudsters used in committing fraud. Sections 3.21 discuss the methodology, variables constructions and hypothesis formulation. The final section 3.24 provides analysis of results and conclusions.

3.1 Introduction to the study (a) Research problem (b) Research objective (c) Contributions		3.20 Trust position of fraudster (a) fraud triangle framework (b) fraud diamond (d) Six trust positions
3.5/6 Literature Review (a) Financial crisis-causes (b) Effects of the crisis (c) Accounting fraud (d) The fraud triangle		3.21 Data Analysis (a) Empirical construct (b) Hypothesis (d) Empirical models
3.10 Corp Governance (a) Principle & rule based (b) US sox and UK c. gov (c) AC & trust pathways (d) AC & earnings mgt.		3.24 Analysis of Results (a) Results during crisis (b) Results post crisis (c) Reliability test (d) AC & earnings mgt
3.16 Theoretical framework (a) Legitimacy theory (b) RBV and KBV (c) Information asymmetry		8 Discussions of outcomes (a) Conclusion (b) Applications (c) Limitations to the study

Figure 3. 1 Chapter summary

3.2 Research problem

The 2007/8 financial crisis represents an unexplored negative shock to the corporate governance systems of most firms around the world. Corporate investments and returns declined significantly following the onset of the crisis. Firms' financial positions suffered a massive setback as investors' trust in management plummeted. There are conflicts in the literature regarding the causes of the financial crisis. Some of the corporate governance literature attributes the cause of the crisis to a poor corporate governance

system (Acharya & Richardson, 2009; Johnson & Mamun, 2012; Ragothaman, 2013; Thakor, 2015). Other studies posit that strengthening the oversight and monitoring responsibilities of the AC can help mitigate possible future financial crisis (Farber, 2005; Aldamen et al., 2012; Holm & Zaman, 2012). For example, adopting a better corporate governance that enables the appointment of a well-experienced accounting certified finance expert to chair the AC can improve monitoring and reduce the problem of information asymmetry (Aldamen et al., 2012). However, there are little or no studies examining AC effectiveness during and post crisis periods to increase my knowledge and understanding about the effectiveness of the AC. There is a significant literature on the effect of AC size, independence and other board characteristics on firm performance (Klein 2002); however, our understanding about the effects of AC on firm value, especially during periods of economic uncertainty, is scattered and shallow. The general wisdom is that a highly independent AC is associated with improved monitoring of financial reporting process (DeZoort et al., 2002; Beasley et al., 2009). Contrary to this assertion, other studies show that as AC's develop friendships with other board members over time, their independence can be questioned. As a result, independence may not be able to guarantee the effectiveness of the AC or improve firm performance (Klein, 1998; DeFond et al., 2005; Aldamen et al., 2012; Bruynseels & Cardinaels, 2013; He et al., 2017). Further, most AC studies were conducted under normal market conditions, thereby giving rise to inconsistent results about AC contributions to corporate outcomes. This study contributes to the corporate governance literature by examining AC attributes and CSD effects on performance and firm value during the crisis period and after the crisis period.

3.3 Research objective

The main objective of this study is to increase my understanding of the corporate governance system and the contributions of ACs to firm outcomes by exploring further the factors that caused the 2007/2008 global financial crisis. The 2007/8 financial crisis damaged investors' trust significantly. Therefore, to be able to restore investors' confidence in the corporate governance system, this study examines the causes of the 2007/8 financial crisis from the perspective of the six trust pathways. The six trust pathways are unique decision making pathways (cognitive process) that can be captured using the throughput decision making framework (TPDMF). Thus, the six trust pathways capture the mental models of decision makers during their cognition process. In addition to identifying the causes of the financial crisis, this study aims to use the six trust positions to further examine the dominant pathways used by fraudsters in committing fraud. I explore further the fraud triangle theory in relation to the six trust pathways, the effectiveness of the AC in monitoring fraudulent behaviours, including earnings management, and the effectiveness of the ACFE, NACFE and AC chair in monitoring the financial reporting process in a way that contributes positively to firm value.

3.4 Contributions

I contribute to the literature in six ways. First I examine the causes of the 2007/8 financial crisis from the perspective of the six trust pathways. This approach will offer both policy makers and future researchers the opportunity to identify not only the root cause of the financial crisis but also the dominant pathways used by fraudsters in committing fraud. Second, I contribute to the literature by providing an empirical study that simultaneously examines the effects of ACFE, NACFE, AC chair and CSD on corporate financial performance and firm value all in one study. Third, previous empirical studies have used mostly OLS regression, Tobit, or logit regression in examining AC effects on firm

performance, producing mixed results. I argue that AC attributes such as knowledge and experience constitute unobservable construct which cannot be captured by OLS regression. I contribute to the literature by using a throughput structural equation model (TPSEM) that has the capacity to capture unobservable AC attributes. Fourth, I simultaneously examined the effects of ACFE, NACFE, AC chair, executive compensation and CSD on corporate financial performance and firm value both during and after a period of economic instability, all in one study. Fifth, I relate AC effectiveness to the six decision making trust pathways in order to identify the pathway that can provide the firm with the maximum returns. Last but not the least, this study examines the effectiveness of the AC from three main perspectives. First, from the perspective of accounting fraud, second from the perspective of financial reporting quality (measured using earnings management), and third I examine the effect of the AC on firm value. I extend the corporate governance literature by simultaneously examining the above three dimensions of AC effectiveness during periods of both economic uncertainty and economic stability. Previous studies have either looked at AC effectiveness from the point of view of earnings management or during periods of economic stability. As far as I am aware, the study by Alderman *et al.* (2012) is the only one that has examined AC effectiveness during a period of economic uncertainty.

3.5 The 2007/8 financial crisis – causes and implications

The 2007/8 global financial meltdown was the worst economic and financial disaster since the great depression in 1929. Early signs of the crisis begun when US house prices started falling during 2006/2007. However the crisis entered a critical stage after the collapse of major US multinational companies, such as Lehman Brothers and Enron in 2008. Other major European banks, such as Northern Rock and the Royal Bank of Scotland in the UK, were affected by the collapse of the US subprime mortgage market.

For example, the collapse of the three largest banks in Iceland led to the entire country of Iceland going bankrupt (Acharya & Richardson, 2009). Many financial institutions in Europe faced acute liquidity problems to the extent that they were required to raise their capital adequacy ratio. The crisis spread across Europe, Asia and Africa due to the "interwoven" nature of the global financial market. Efforts by both American and European governments to rescue the global financial crisis led to the infusion of capital into most banks and the passage of emergency economic and financial stability acts in 2008. As the crisis developed, major stock market around the globe suffered a massive nosedive, as shown in figure 3.2 and figure 3.3 below.

Total return by index, 2005 = 100

Source: Datastream, Goldman Sachs Global Investment Research.

Figure 3. 2 GFC effects on global investment returns by index
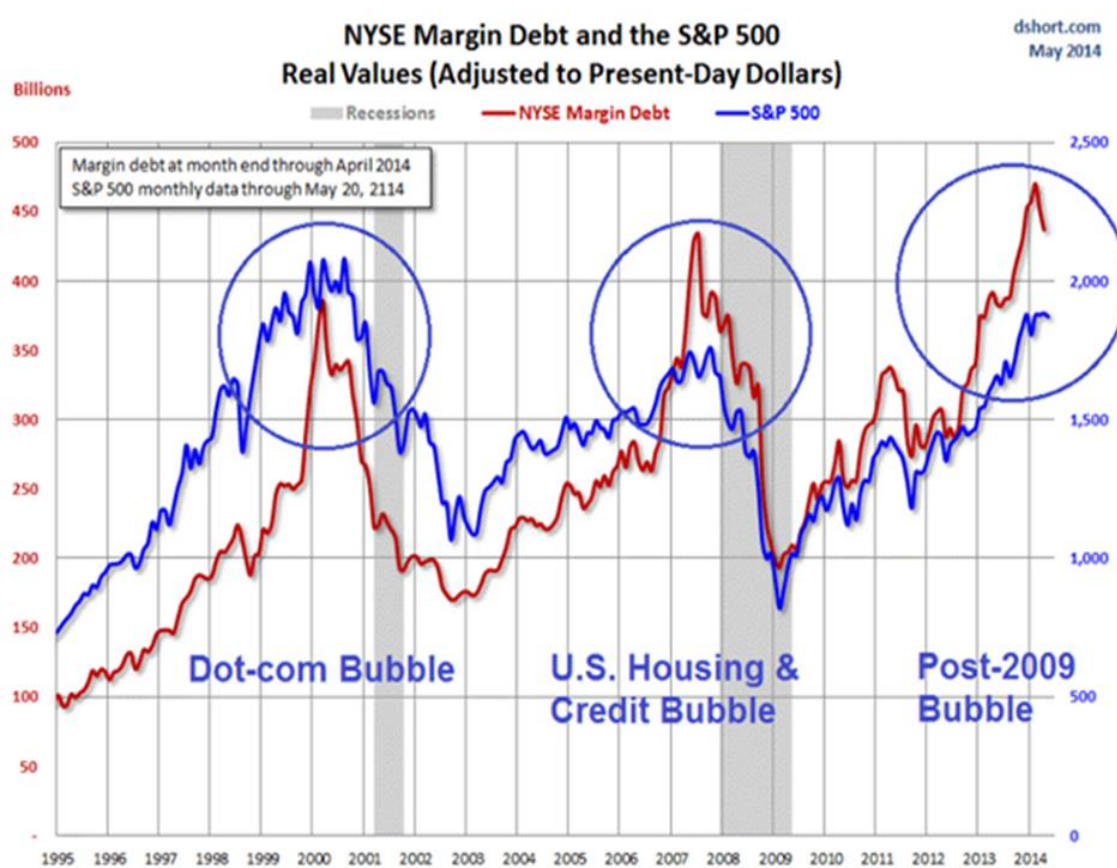
Figure 3. 3the effects of GFC on Dot-com companies and US housing market

In an attempt to salvage the financial mess, the US government proposed a $700 billion plan to buy underperforming securities and assets. However, a section of the US Congress blocked the initiative on the grounds that it is unfair to use taxpayer's money to bail out Wall Street bankers. The failure of the US government's $700 bailout coupled with several other subsequent major US corporate accounting scandals, such as the American International Group (AIG), Lehman Brothers, Bernie Madoff etc., all in 2008 led to a further deterioration of global market sentiments. As the financial panic increased, many investors lost trust in the financial market, instead finding solace in US treasury bonds, gold and other precious commodities. The UK government lunched a £500 billion bailout plan in 2008 to inject additional liquidity into the system. The UK government nationalised major distressed banks, including the Norther Rock and the Royal Bank of Scotland. Many European governments emulated the UK's example. By the middle of

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2009, the financial crisis had effected the entire global gross domestic product as a result of the crash in the major stock market in USA, Europe and Asia. Figure 3.4 shows the fall in the global GDP caused by the 2007/2008 financial crisis.
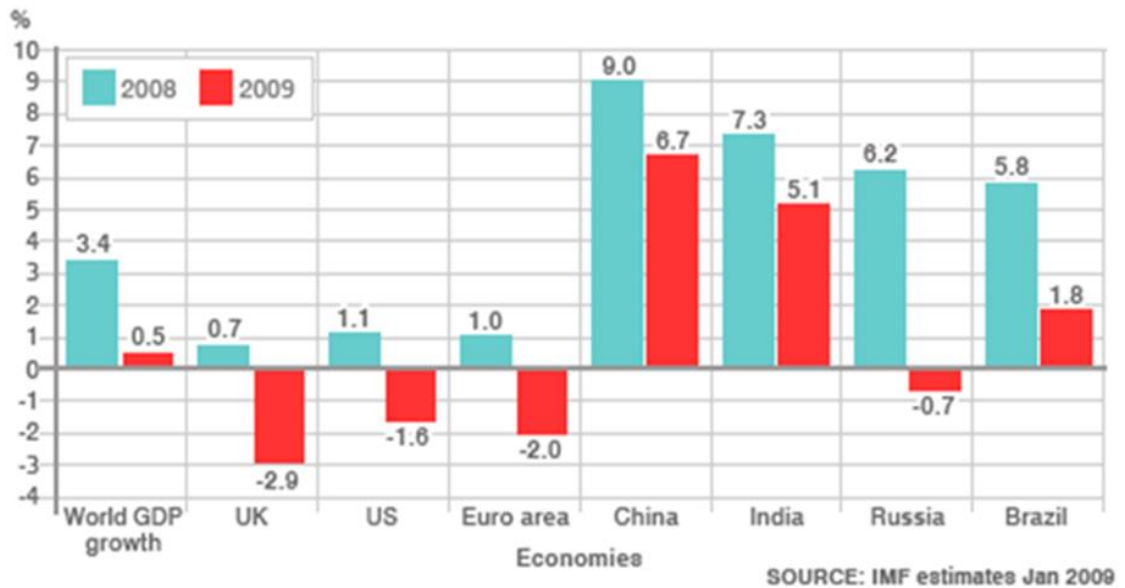
Figure 3. 4 the effects of GFC on global GDP growth

Some scholars argue that the causes to the 2008 financial crisis can be linked to multiple factors, including unethical leadership and corporate greed by the top management teams (TMTs) (Acharya & Richardson, 2009; Chen, 2010; Caplan et al., 2012; Erkens et al., 2012; Johnson & Mamun, 2012; Ragothaman, 2013; Stolowy et al., 2014; Thakor, 2015), the collapse of the US subprime market due to excessive bank securitisation (Acharya & Richardson, 2009), poor corporate governance and inefficient internal controls (Acharya & Richardson, 2009; Patra, 2010; Soltani, 2014; Bhasin, 2016), and a breakdown of trust within the financial system (Acharya & Richardson, 2009; Patra, 2010; Morales et al., 2014; Soltani, 2014).

3.5.1 TMT greed, accounting malfeasance

Previous studies show that TMT greed constitutes the main cause of the 2007/2008 economic crisis (Acharya & Richardson, 2009; Chen, 2010; Fahlenbrach & Stulz, 2011; Johnson & Mamun, 2012; Ragothaman, 2013; Stolowy et al., 2014; Thakor, 2015). Free enterprise economist researchers have posited that the wealth of nations can be maximised as a result of globalization and trade liberalization (Topalova, 2010; Bustos, 2011). However, globalisation of the world financial market has provided a fertile ground for corporate accounting malfeasance and executive greed (Carson, 2003; Fahlenbrach & Stulz, 2011; Caplan et al., 2012). In this study, I define corporate accounting malfeasance as the use of misleading or false accounting information or a deliberate alteration to or omission of accounting entries from the financial statement (Prechel & Morris, 2010; Harris et al., 2017). For example, Acharya *et al.* (2009) posited that accounting malfeasance, including irresponsible and fraudulent acts perpetrated by a handful of greedy directors of giant multinational companies such as Enron, WorldCom, and Lehman Brothers etc., contributed to the 2007/8 financial crisis. Harris *et al.* (2017) identified six critical reasons for corporate accounting malfeasance, including internal pressure in meeting unrealistic targets, income smoothing, and TMT short-term thinking, ambiguities in accounting rules, poor corporate governance, and executive self-interest. Figure 3.5 below shows some of the motivation behind corporate accounting malfeasance.

Information on figure 3.5 represent the summary findings from the previous studies on the causes/motivation behind corporate accounting malfeasance (Acharya & Richardson, 2009; Chen, 2010; Fahlenbrach & Stulz, 2011; Aebi et al., 2012; Thakor, 2015).

Figure 3. 5 some causes of corporate accounting malfeasance

(Adopted from Acharya & Richardson, 2009)

Prechel *et al*. (2010) argue that, like cyber-crime, corporate accounting malfeasance constitutes a serious threat to most organisations around the world. For example, over the past few years fraudulent deals by corporate directors have had a significant impact on both local and global economies as a whole. Some scholars argue that if there is one major competitor to global terrorism, then that is executive greed and accounting malfeasance by the directors and boards of directors of multinational companies (Low et al., 2008; Acharya & Richardson, 2009; Patra, 2010; Bhasin, 2016). The intentional manipulations of financial statements by trusted TMTs have been identified by most accounting scholars as the major practice used by TMT to cover up their greedy behaviour (Bhasin, 2015; Lin et al., 2015). For example, some accounting scholars argue that the common trend running throughout these high profile corporate scandals is related accounting irregularities (such as earnings management, suppressing huge debt from the balance sheet, inflating corporate assets, money laundering, theft, etc.). The past few decades have seen an incredible amount of fraudulent activities involving accounting misstatements, which led to the collapse of giant multinational companies such as Enron, Tyco etc. during the

2007/2008 financial crisis. Unfortunately, lessons have still not been learnt and corporate greed has increased and metamorphosed into new dimension such as lies. For example, in 2016 Volkswagen promised its customers that its diesel-engine cars were not only fuel efficient but also clean enough to meet the US air protection quality standard. This led to increased sales of Volkswagen in America. The Environmental Protection Agency air quality standard in America is different from the European emission standards, which focus more on greenhouse emission (primarily carbon dioxide), whereas the US emission standard principally aims at limiting adverse health effects and smog. To outmanoeuvre this difference, Volkswagen developed a "defeat device" that allowed their cars to pass the EPA's test in the US. Every Volkswagen diesel was equipped with special software that detected when the car was undergoing emissions testing. This software immediately triggered a tightening of the car emissions control system to enable the car to pass the emissions test. However, as soon as the car left the test lab, the engine returned to the original state, spewing nitrogen oxide (NOX) at forty times the tolerable limit. The level of NOX spewed by these Volkswagen diesel engines is capable of causing respiratory problems such as asthma, especially among children and the elderly. In June 2016, Volkswagen agreed to pay $14.7 billion to settle claims from dissatisfied customers and as a fine for violating the Clean Air Act.

3.5.2 Director's self-interest, disclosure, control mechanism, auditing and governance

The agency theory posits that there is a potential for corporate directors to maximise their self-interest at the expense of the company (Fama & Jensen, 1983b). The common trend among the governance of the top fifteen corporations during the 2007/2008 financial crisis was directors putting their interests first at the expense of the owners (Jensen & Meckling, 1976; Fama & Jensen, 1983b; Eisenhardt, 1989). It is the responsibility of

those charged with governance to produce mechanisms and frameworks capable of aligning the interests of key stakeholders of the company. However, some scholars argue that when managers' and owners' interests diverge, directors mostly align their interest with the owners through an "agent-equity" that may be biased towards the self-interest of the directors (Nyberg et al., 2010). Further, Nyberg and Fulmer (2010) argue that incentives for such alignment usually takes two dimensions: (a) financial alignment, whereby the director's economic reward covaries with the level of the owners' power and (b) alignment of preference and action where the director's preference is more aligned with the owners, however their choice of action is motivated by the director's self-interest. A lack of alignment results in agency cost and other opportunistic behaviour of the directors (Jensen & Meckling, 1976; Fama & Jensen, 1983b; Eisenhardt, 1989) Most of the directors involved in the 2007/2008 corporate accounting standards were motivated by financial gains, ethical egoism and greed (Acharya & Richardson, 2009; Patra, 2010; Soltani, 2014; Bhasin, 2016).

3.5.3   Internal controls and audit committee

Further, most of the companies involved in the 2007/2008 accounting scandal had an inefficient audit committee, a weak internal control system and poor auditor's judgment (Acharya & Richardson, 2009; Soltani, 2014; Mansor, 2015; Bhasin, 2016). Internal control (ICO) involves the entire system of controls, financial or otherwise, that provide assurance for the achievement of the organisation's objectives. ICO aims at ensuring operational effectiveness, reliable financial reporting, and compliance with regulations and policies. Further, ICO plays a prominent role in the prevention of fraud and the protection of the company's resources. Auditing is not only complex in a situation of weak internal controls system but also costly and inefficient. The Committee of the Sponsoring Organisation of the trade way Commission (COSO) provided an integrated

framework of five key internal control components; these include control environment, risk assessment, information and communication, control activities, and monitoring. The control environment sets the tone of the control culture in the organisation and provides control consciousness to employees (DeZoort et al., 2002) The identification, analysis and evaluation of risk (the second element of IC) provides the basis for risk management in the company. The third element of IC is information and communication, which serve as the lifeblood of IC in that they enable employees to carry out their responsibilities. Control activities, which comprise the fourth element of IC, set out the policies and procedures that guide the performance and implementations of management directives. The monitoring process of IC is mostly championed by the audit committee.

The audit committee (AC) forms an important element in corporate governance. The audit committee of the board is responsible for the oversight of financial reporting and disclosure quality and for ensuring that financial integrity is maintained in the company. Further, it is the responsibility of the AC to ensure that the company complies with the relevant rules, legislations and regulations. IFRS (International Reporting Framework and Standards), SOX 2002, and the EU Directives 2006 section 43 etc. stipulate that companies should have an AC on their board with at least one of the members of the AC being a financial expert. Some scholars argue that poor audit judgment caused by a weak internal control system was one of the key causes of the 2007/2008 financial crisis (Acharya & Richardson, 2009; Patra, 2010; Morales et al., 2014; Soltani, 2014; Lin et al., 2015; Bhasin, 2016). SOX was implemented in response to the huge corporate accounting scandal during the 2007/2008 financial crisis. SOX 2002 sections 302 and 404 focused on the assessment and disclosure of the internal control weakness of companies (Bedard & Graham, 2011). The Sarbanes Oxley Act 2002 section 302 requires the CEO and the CFO to evaluate quarterly the design and effectiveness of the internal controls and report their findings about their effectiveness (Sox 2002 Section 302).

3.5.4   Securitisation of debt

Securitisation allows banks to avoid holding costly capital (Acharya & Richardson, 2009; Keys et al., 2010) by pooling various types of contractual debts, such as residential and commercial mortgages, and selling them to third party investors as securitised debt. Investors (equity holders) are repaid from the principal and interest cash flow collected from the underlying debt. Some scholars argue that the complexities and risk associated with securitised debt usually make it difficult for auditors and boards of directors to monitor companies (Acharya & Richardson, 2009; Keys et al., 2010). Further, the highly competitive securitization market prevailing prior to the financial crisis resulted to a sharp decline in the quality of underwriters. In 2007, assets backed securities amounted to $3.455 trillion in the US and $652 billion in Europe. Debt securitisation increased in 2007/2008 significantly. A large percentage of the securitised debt comprised credit card backed securities and home mortgage backed securities. Most financial institutions used the off-balance sheet approach to record the ABS transactions. Further, securitization allows for the creation of more highly rated securities such as AAA, AA or A. These highly rated securities drew most companies owned by institutional investors to invest in the ABS market. The majority of revolving assets backed securities (ABS) are subject to early amortisation risk, which means that most of the ABS have to be paid pre-maturely. Typically, pre-matured payment is associated with insufficient payments from the underwriters, insufficient excess spread and a rise in the default rate. Further, like all other investments, the price of ABS is associated with the changes in the interest rate (Acharya & Richardson, 2009; Keys et al., 2010). The increase in the interest rate on household mortgages and credit cards led to an increase in the default rate. The early sign of the US housing market collapsing coupled with a high default rate by borrowers led to most banks "squeezing credit".

3.2.5 Executive compensation and bonuses – excessive risk taking

Executive compensation has always been a bone of contention in corporate governance all over the world. The executive compensation scheme provides companies with the opportunity to attract, motivate and retain the best skills in the market. However, according to agency theory, there is a possibility for directors to maximise their self-interest by indulging in opportunistic behaviour. Financial incentives in the form of bonus, high executive remunerations etc. were identified as a key cause of the 2007/2008 financial crisis. Some scholars argue that the huge performance based compensation schemes adopted by most financial institutions were a key contributory factor in the 2007/2008 credit crisis (Bebchuk et al., 2010). For example Bebchuk *et al.* (2010), who studied the executive compensation schemes of Bear Stearns and Lehman Brothers between 2000 and 2010, found that the TMT of Bear Stearns and Lehman Brothers derived a total cash flow of about $1.4 billion and $1 billion, respectively, during the years leading to the 2007/2008 financial crisis (Bebchuk et al., 2010). The huge executive pay arrangement, which was mainly performance related, was indeed an excessive risk taking incentive for most TMTs in the financial sector (Bebchuk et al., 2010; Fahlenbrach & Stulz, 2011). In the period leading up to the crisis, most directors were increasingly paid through short term cash bonuses and other performance related incentives (Acharya & Richardson, 2009; Bebchuk et al., 2010). As a result, most CEOs gambled on the "lucrative" securitized debt market, which resulted in devastating results (Acharya & Richardson, 2009; Keys et al., 2010; Fahlenbrach & Stulz, 2011). Other scholars argue that financial innovations and CEOs' overconfidence about assets value and the riskiness of the new financial products, such as the assets based securities (ABS), were the key cause to the financial crisis (Boz & Mendoza, 2014). Chief executive officer (CEO) overconfidence and excessive risk taking was a key contributory factor to the 2007/20088

global financial crisis (Acharya & Richardson, 2009; Fahlenbrach & Stulz, 2011; Aebi et al., 2012).

3.5.5   The US subprime mortgage market

Some scholars argue that the 2007/2008 global financial crisis resulted from the collapse of the US subprime mortgage market (Longstaff, 2010). Previous studies show that the US subprime mortgage boom led to most banks printing more monies (Acharya & Richardson, 2009; Keys et al., 2010; Thakor, 2015). Increased borrowing led to increased personal (household) debt. Poor loans and plummeting values of collateralised debt obligation caused banks to squeeze credit. Figure 3.6 below shows the causes of the global financial crisis.
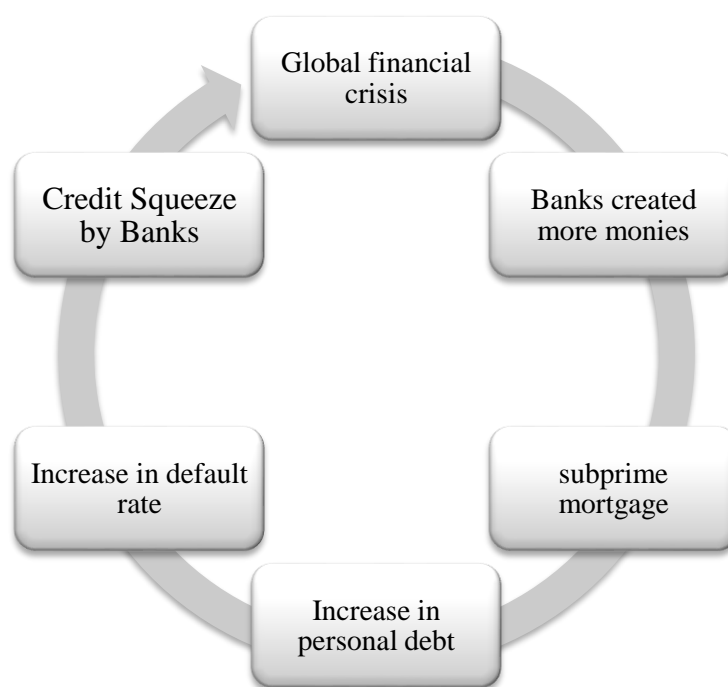
Figure 3. 6 causes of the 2007/8 global financial crisis

Corporate accounting scandals has earned a place among the defining themes about the causes of the 2007/8 global financial crisis (GFC). I provide a retrospective perspective of the worst corporate accounting scandal that contributed to the 2007/8 global financial crisis from 1998-2009. Previous studies show that, the 2007/8 GFC started several years

before the actual crisis (Acharya & Richardson, 2009; Adams, 2012). For example between 1997 and 2008, US witnessed an unprecedented accounting scandal involving some of the biggest corporate entities such as Enron, WorldCom, Lehman brothers, Tyco, Freddie mac, Bernie Madoff etc. During this periods, trillions of dollars of investors and public funds were misappropriated by CEOs, and other TMTs leading to the collapse of these companies. A lot of people lost their jobs as a result. Further, during same period the US household debt as a percentage of annual disposable personal income was 127% (Acharya & Richardson, 2009; Keys et al., 2010; Fahlenbrach & Stulz, 2011; Thakor, 2015). The excessive household debt was caused by lenders offering households risky financial products such as mortgaged –backed security, credit default swap, collateralised debt obligations etc. (For example banks created more money by providing customers lower interest rate credit cards or personal loans with generous payment terms). The highly unregulated financial market coupled with high lender-competition meant that, credits were offered to customers at a very low interest rate without due diligence. A lot of households borrowed larger amount of money against the value of their home. Therefore, when the price of their houses started declining, a lot of households were unable to pay their debts and consequently lost their mortgages. The increase default rate led to most banks squeezing (reducing) their credit to households and businesses. Accounting misstatements among TMT's remains the biggest problems in most firms. In table 3.1 , I provide examples of the world's top accounting scandals involving TMT's accounting misstatements from 1998 prior to GFC to 2009 (during and after the GFC).

Table 3. 1 top accounting scandals that caused the 2007/8 financial crisis

Company	causes	Accounting Misstatement	Effects
Houston based Publicly traded Waste Management Company – USA (1998)	Directors allegedly falsified earnings by increasing the number of years for charging depreciation for their plant property and equipment. The perpetrators of this fraud involve the CEO, chairman and auditors from Arthur Anderson company	Earnings management involving a reported earnings misstatement of $1.7 billon. This scandal was uncovered by a new CEO who was appointed to head the company.	The company had to settle a total bill of $457 million court fine to shareholders. SEC fined Arthur Anderson (Auditors) $7million. CEO set up a whistle blowing hotline to enable employees report dishonest behaviour or fraud as a means of building trust
Enron Scandal (2001)	The CEO and the CFO were involved in off the balance sheet financing (failure to disclose huge company debt to investors). Enron has been named by Fortune Magazine as the most innovative company for six years in a row before in the midst of these scandal	Earnings Management involving balance sheet financing were used to supress total debt. Auditors Arthur Anderson was found guilty for fudging Enron's Accounts. Fraud was uncovered by internal whistle blower.	CEO received 24 years jail sentence and the company lost a tremendous amount of its share price
WorldCom Scandal (2002)	Directors inflated the assets of the company by over $11billiion. This led to the congress passing the Sarbanes Oxley act 2002	Earnings management involving capitalization of revenue expense into assets thereby increasing revenue and reducing expenses. The internal audit department of WorldCom uncovered $3.8 billion of the fraud	The WorldCom scandal led to about 30,000 job lost. The chief finance officer (CFO) resigned, CEO was sentenced to 25 years in jail and the company filed for bankruptcy.

Company	causes	Accounting Misstatement	Effects
Tyco Scandal (2002)	The CEO and CFO embezzled $150 million of company funds and inflated Tyco's income by $500 million.	Money laundering involving CEO and CFO using fraudulent stock sales and unapproved loan system to withdraw company funds and convert the funds into executive bonus. The benefits received were then transferred into their foreign accounts. CEO used part of the money ($2 million) to throw a birthday party for his wife.	SEC and New York Police department fraud investigation department uncovered the scandal. Tyco was made to pay $2.92 billion fines to investors in a lawsuit. SEC enacted SOX 2002 to restore trust in the US corporate system
Lehman Brothers (2008)	The executive directors of Lehman Brothers connive with the company auditors (Ernst and Young) to hide $50 billion worth of loans on the company balance sheet Lehman brothers was ranked the best securities company in the midst of the scandal.	Earnings management involving directors converting total figure of $50 billion unpaid mortgaged balance (Subprime loan to customers) into sales. Directors sold fictitious assets to a Bank in Cayman Island for $50billion to cover up for the unpaid mortgage loans	The company was forced into the largest bankruptcy in US history. The collapse of Lehman brothers triggered the 2008 financial crisis
Bernie Madoff (2008)	Directors paid dividend out of equity funds rather than from the company's profit (Thus giving part of shareholders' funds to them as dividend). Madoff fraud was revealed just few months into the 2008 US financial crisis.	Earnings management involving directors providing false information to shareholders that the $64.8billion paid to them were actual dividends from the company's profit	Madoff was arrested after telling his son about the fraud. This scandal exacerbated the US financial crisis in 2008.

Company	causes	Type Accounting Misstatement	Effects
The American international Group AIG Scandal (2008)	AIG held $57.8 billion out of $441 billion worth of securities originally rated AAA as the US subprime mortgage crisis unfolded. AIG since 2001 until 2008 ha been involved in fraudulent transfer of insurance transactions to boost up their clients company. In 2005 AIG was involved in a net income restatement totalling $1.32billion.	Earnings management involving loss transfer across subsidiaries, fraudulent transactions between clients to increase total assets of the company. AIG paid total settlement in excess of $1.6billion of court fines to affected shareholders	In 2008, federal criminal charges were filed against directors of AIG for alleged violation of sixteen count of criminal codes including false accounting misstatement and fraud.
Northern Rock (2008)	Northern Rock operated with a business model of borrowing heavily in the UK and international money market to extend mortgages to customers. Poor risk assessment coupled with the collapse of the US subprime mortgage market led to the bank inability to pay its debts.	Poor Risk management were identified as a key cause to the bank collapse. The bank should have taking into accounts the risk associated with borrowing from the international money market	Northern Rock was nationalised by the UK government when depositors run to the bank for their monies. The bank was taking over by Virgin monies in 2012.
Anglo Irish Bank (2008)	Directors and Chairman/founder of Indian IT service back-office accounting firm falsely inflated total revenue by $1.5billion. Shareholders lost about $1 billion through panic selling.	Earnings management involving CFO and CEO making false provision for impaired loan to the tune of €4.9billion instead of €9.5 billion. Therefore total liabilities was understated by €4.9 billion.	Anglo Irish Bank lost 70% of the loans outstanding to Directors. In 2011 the bank announced €17.7 billion loss the highest in the history of Ireland. To restore trust, the Bank changed its name to Irish Bank Resolution Corporation

Company	causes	Accounting Misstatement	Effects
Saytam (2009)	Directors paid dividend out of equity funds rather than from the company's profit (Thus giving part of shareholders' funds to them as dividend). Madoff fraud was revealed just few months into the 2008 US financial crisis.	Earnings management involving the founder/chairman and the Directors of the company. Total revenue overstated by $1.5billion in 2009. The chairman/founder Raju admitted the fraud in a letter to the board of directors	Raju and his brother were charged with breach of trust, conspiracy and falsifications of accounts. To restore trust Saytam changed their name by merging with Tech Mahindra.
Royal Bank of Scotland (RBS) 2009	In March 2009, RBS Directors revealed that it has been involved in the purchase and sale of subprime securities under supervision of its CEO. Further, the Bank had set up a tax avoidance department which has helped it to avoid £500m tax	Earnings Management involving overestimation of profit after tax through tax avoidance. Billions of securitised assets have been channelled to the Cayman Islands to avoid tax. RBS announced £12 billion right issue to offset £5.9billion bad loans.	RBS finds itself insolvent as a result of the US subprime mortgage crisis. RBS recorded £24 billion loss in 2008. The UK government in an attempt to restore trust used tax payers' money to bail out the bank.
Taylor, Bean & Whitaker (TBW) 2009	Directors sold $1 billion dollar non existing mortgage to their Bankers as a security to cover up their illegal overdraft balance of $100 million. Further, FBI report indicates that TBW signed $300million equity stake in Colonial BancGroup	Earnings management by Directors through assets overstatement by creating a mortgage loan of $100m and $300m equity deal with their creditors Colonial BancGroup. TBW sued PriceWaterhouse Coopers (Auditors) for negligence.	The entire board of Directors of TBW resigned. Two thousand employees lost their jobs. The company filed for bankruptcy protection in 2009. Six executive Directors of TBW received jail sentence for their fraudulent behaviour.

Figure 3.7 show diagrammatic perspective about key factors that led to the GFC from the view point of previous studies (Carson, 2003; Bebchuk et al., 2010; Keys et al., 2010; Caplan et al., 2012; Johnson & Mamun, 2012; Ragothaman, 2013)
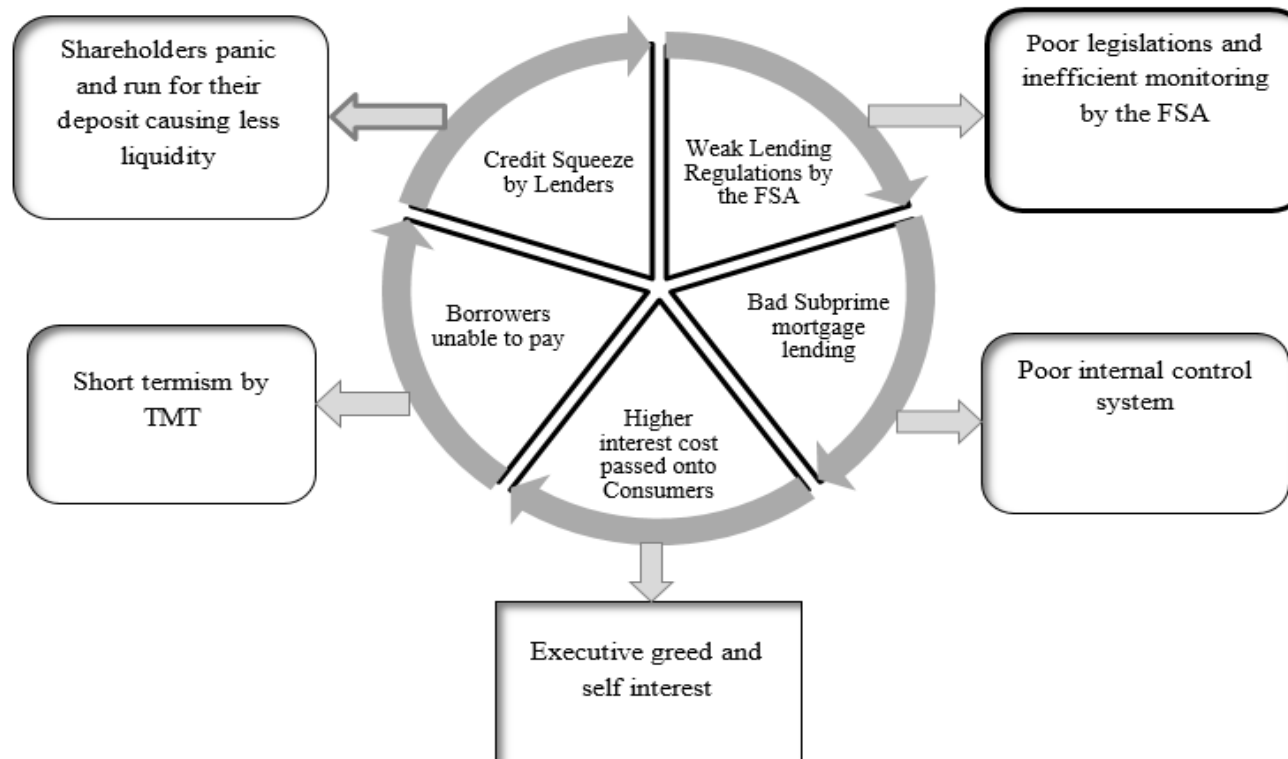
Figure 3. 7 Others causes of the 2007/2008/ GFC

3.6 Fraud triangle framework (FTF) and fraud diamond framework (FDF)

The rationale, motivation and justifications for most of the largest corporate scandals have still not received the needed attention in the accounting and finance literature. Several multinational companies have experienced **fraudulent activities** and or financial **accounting irregularities** over the past years. These fraudulent activities have had a devastating effect on both the company and the global economy at large. For example, cases such as Enron, WorldCom, and Lehman Brothers etc. contributed to the 2007/2008 global financial crisis. However, little is known about the underlying rationale behind the perpetrators of these fraudulent activities. I use the fraud triangle theory, the fraud diamond theory and the trust pathways to explore the trajectories used by TMTs during fraudulent activities. This will deepen our understanding of why TMTs engage in fraud and will also provide some vital indicators for future research.

The extant literature in accounting is dominated by fraud-related issues and how to prevent fraud. Most accounting scholars agree that it is less expensive to prevent fraud from occurring than to solve fraud-related problems. Understanding the motivation and rationale behind fraud is an important step towards preventing fraud. Fraud prevention is the responsibility of those charged with overseeing corporate governance. Albrecht *et al.* (2012) posit that the key part in fraud prevention should start with identifying the behavioural characteristics of the fraudster using the fraud triangle theory (FTF). Rodgers (2013), in contrast, argues that TMTs are put in a position of trust and, as a result, the key step to identifying fraudulent behaviour is understanding the different trust/mistrust positions of TMTs during decision making by using the trust-throughput model (TPM). Further, Wolfe and Hermanson (2004) argue that FTF and TPM alone cannot help in fraud prevention; rather, understanding the skills level and capabilities/status of the fraudster using fraud diamond theory (FDF) is paramount in fraud prevention. I therefore

use all three in this study in order to provide a comprehensive perspective on fraud prevention.

3.7 The fraud triangle theory (FTT) and fraud prevention

Since the 2007/2008 financial crisis, fraud has received a high level of attention from most regulators, auditors, accounting professionals and accounting researchers. Meanwhile, most organisations have spent a higher proportion of their resources to prevent fraud (Morales *et al.* 2015) However, the Association of Certified Fraud Examiners (ACFE) argue that there is still a high prevalence of fraud in most companies worldwide. For example, in 2016 the ACFE report examined 2410 fraud cases worldwide, categorising their findings into three main forms of fraud (assets misappropriation, corruption, and financial statement fraud). Their findings show that assets misappropriation, financial statement fraud and corruption are the major types of fraud recorded by companies globally.

The fraud triangle theory can be dated back to the work of Donald Cressey in 1953, who interviewed 250 criminals to find out why people commit fraud. Cressey's (1953) investigations show that the three key factors that contribute to fraud are pressure/incentives, opportunity and rationalization.

3.7.1 The perceived pressure (PP) or incentive

The PP relates to the motivation that drives the fraudster to commit fraud. Some scholars argue that pressure or incentive alone does not constitute enough force to lead someone to commit fraud (Albrecht 2016; Lister 2007; Fazli *et al.* 2014). However, it is the perception of the offender which stimulates their desire to commit fraud (Mansor, 2015; Ruankaew, 2016).The perception of the offender is governed by their beliefs, ethical positions, culture, religious background etc. (Rodgers, 2010b). For example, Morales *et*

al. (2015) argue that an individual's morality is perceived as the key source of fraud rather than the pressure for material gains. Other scholars argue that it is the character and the set of ethical abnormalities of the individual that can lead them to intentionally commit fraud (Stadler & Benson, 2012; Morales et al., 2014). In furtherance to the above arguments, the perception of the individual (how the individual frames their problem or their world view about the act to be performed) drives their action to commit fraud. The literature on perceived pressure to commit fraud can be broadly classified into non-shareable financial incentives or non-shareable non-financial incentives (Cressey, 1953; Dorminey et al., 2012; Stadler & Benson, 2012). The non-financial pressure can further be categorised into work-related pressure, pressure associated with life style, and pressure associated with satisfying the individual's ego (egocentric motivation). Work-related pressure can take the form of the individual's reaction to bullying, fear of job loss, unfair treatment at work (promotion, remuneration bonus or incentives) or perceived inequities in the workplace. The non-shareable financial incentives can take the form of greed and the desire to acquire excessive wealth to enhance personal prestige.

3.7.2   Perceived opportunity (PO) to commit fraud

Cressey (1953) identifies a perceived opportunity to commit fraud as another element in the fraud triangle theory. This situation arises when an individual in a position of trust commits a fraudulent act to address their non-shareable financial or non-financial interest. The extant accounting literature examines a perceived opportunity within the context of a weak financial control system (KPMG 2008; 2010; 2016), which according to most accounting scholars is a major contributory factor to many cases of corporate fraud (Albrecht et al., 2004; Brytting et al., 2011; Morales et al., 2014). Some accounting scholars argue that opportunities signifies the absence of an effective internal control system, such as a lack of supervision or the inadequate segregation of duties (Krishnan,

2005). Other scholars, such as Krishnan (2005), argue that individuals will still take advantage of an internal control system no matter how strong it is; after all, no control system is impermeable. Further, when the individual has the technical skills, knowledge and expertise (especially about inside information and computer systems), they can commit fraud and conceal it (Posey et al., 2011). Further, the ACFE (2016) report shows that most corporate fraud is a collusion between insiders and outsiders. Sometimes a complex network of collaborations between directors and outside agencies can create an opportunity for accounting misconduct. Other scholars from a criminal psychology background argue that coercion and social support are key conditions for criminal behaviour (Donegan & Ganon, 2008; Stadler & Benson, 2012). They argue that individuals who have been denied access to social support from a legitimate source may explore illegitimate sources to satisfy their social needs (Albrecht et al., 2004; Donegan & Ganon, 2008; Stadler & Benson, 2012; Morales et al., 2014). Perceived opportunity can be grouped into three major categories, namely the internal/inherent susceptibility of the company to fraud risk, the external susceptibility of the company to fraud risk, and both. The internal risk mostly revolves around the effectiveness of the company's internal control system. The external risk is much more complex due to the complex nature of the internet and online fraud system.

3.7.3   Rationalization of fraud

The third element of the FTT involves a process where the individual endeavours to rationalise their lack of feelings and indifference to justify any guilt arising from their misconduct (Bandura, 1999; Dellaportas, 2013). Some criminologists argue that criminals often use the neutralisation theory to rationalise their fraudulent behaviour (Stadler & Benson, 2012). The neutralisation theory provides an explanation for the ability of the criminal to distance their conscience from the actual fraud committed. The psychological

process of consciously cleansing after committing fraud can be used by individuals to rationalise their misconduct (Albrecht et al., 2004; Dorminey et al., 2012; Stadler & Benson, 2012). Examples of neutralisation techniques include "I had to steal to save my family from starving", "I was entitled to that money anyways", and "I was underpaid and my employer has been cheating on me". Bandura (1999) used the theory of moral engagement to explain how criminals rationalise their misconduct. However, other scholars have used cognitive dissonance theory to explain how individuals rationalise their fraudulent deeds (Festinger, 1962). Rationalisation also involves the individual reconciling their misconduct with the acceptable norms (morally acceptable rationalisation) prevailing within the corporate cult (Albrecht et al., 2004; Brytting et al., 2011; Dorminey et al., 2012). Examples of morally acceptable rationalisations include "I did it because everybody else has been doing it and nothing happened to them". Brytting *et al.* (2011) listed examples of common rationalisation quotes used by fraudsters, including "It's only fair, I have no other choice", "It is just a loan", "They deserve that" and "Everyone is doing it". Similarly, for TMTs the common rationalisation quotes in committing fraud include "It's for the good of the company", "I need to keep the stock price high", "All companies use aggressive accounting practices" and "It is a temporal problem that I will offset by future positive results (Morales et al., 2014; Mansor, 2015; Schuchter & Levi, 2015) Schuchter (2015) posits that fraudsters usually use socially approved vocabularies to neutralise their morally dubious act if their action is called into question. Neutralising the disaccord between the moral and ethical belief of the fraudster and their criminal act shows that the third element of the FTT is a psychological process used by the fraudster to maintain a positive self-image (Schuchter 2015). Figure 3.8 below shows the fraud triangle;
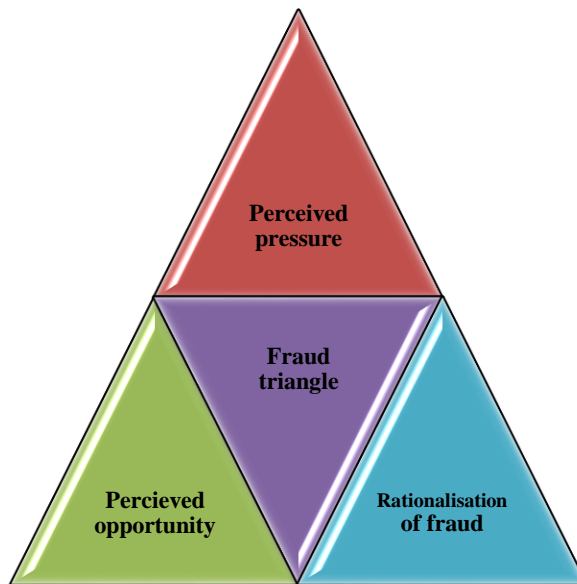
Figure 3. 8 the fraud triangle

3.7.4 Beyond the fraud triangle framework

Cressey (1953) assumed that fraud is committed by individuals who are dishonest and lack morality. Therefore, organisations should endeavour to establish credible layers of control systems capable of preventing employees from committing fraud (Cressey, 1953; Morales et al., 2014). Over the years, subsequent studies have built on the FTF to increase the fraud diagnostic capabilities. For example, Wolfe and Hermanson (2004) proposed a fourth dimension called capability for the FTF, thereby transforming the FTF to a fraud diamond. Among the limitations of the FTF is that the ex-ante behaviour of the individual committing the fraud may be linked to a wider range sociological, psychological and environmental factors which were not considered in the FTF. The FTF therefore provides a simplistic approach to explain the causes of fraud. Some scholars argue that if the FTF theory is effective, why have fraud activities been increasing over the past few years? The causes of fraud are too complex to be explained by just three key constructs that summarise the actions of the trust violators.

Schuchter (2015) argues that fraud is a complex phenomenon that cannot be captured in a triangle containing three key constructs. Further, the framework within which fraud is labelled in the FTF is relative from the legal, social and psychological perspectives. Some scholars argue that the FTF is a sub-set of a generic crime triangle that distracts our attention away from the broader issues on the non-incrimination of privileged TMT elites (Wolfe & Hermanson, 2004; Morales et al., 2014). They argue further that the FTF is a heuristic framework for explaining fraud.

The incentive/pressure to commit fraud is not only biologically driven but may be due to the differences in the organisational or societal culture (Schucter 2015). For example, in some societies, status and social reputation is deemed a priority, and as such TMTs who are bound to social respectability and want to keep their social status within the country may be constrained in committing fraud (Schucter, 2015).

Further, Albrecht *et al*. (1982, p.32) follow Cressey (1953) in arguing that all three conditions (non-shareable problem, opportunity for trust violation and rationalisation) of the FFF are necessary preconditions for committing fraud. This view is echoed by AICPA (2002) and IFAC (2013) in that all three conditions must present for the individual to commit for fraud. This argument has been refuted by Loebbecke *et al.* (2004), who argue that fraud is highly likely if there is opportunity and capability even in the absence of pressure and motivation. In furtherance to this, the argument by Schuchter (2015) posits that all the three elements in the FTF may be necessary, but not sufficient, conditions for fraud.

Romney, Albrecht and Cherrington (1980) proposed a replacement theory to the FTF by summarising their results from an interdisciplinary two-year study. They argue that fraud consist of (i) opportunity plus, (ii) situational pressure and (iii) the personal characteristics of the offender.

They therefore assumed the additive combinations of the FTF plus the personal characteristics of the offender rather than rationalisation. In contrast, some scholars such as Loebbecke *et al.* (1989 pp.2-5) suggested multiplicative combinations of the FTF that include (i) opportunity (ii) multiply by motivation and (iii) multiply by offender's set of ethical values.

Coleman (1987) argues that rationalisation has an inverse association with the legal consequences associated with the fraud. Thus, rationalisation usually increases as the legal consequences associated with the fraud decrease.

According to Schuchter (2015), there is always a fraud inhibiting inner voice before the act and a guilty conscience after the crime instead of the third element of rationalisation in the FTF. The fraud inhibiting inner voice is quieter before the fraud occurs and increases just before the act is committed. However, the longer the fraud remains hidden, the less the offender engages with their guilty conscience. Schuchter (2015) argues that rationalisation has to be complemented by the inner voice (inhibiting or triggering) and the conscience (clear or guilty) before the actor stops or commits the fraud. Therefore, the inner voice and the conscience of the actor play a crucial role in fraud prevention.

Some scholars argue that a complex organisational structure coupled with changing environmental factors can create opportunities for individuals to commit fraud (Wolfe & Hermanson, 2004; Dellaportas, 2013; Schuchter & Levi, 2015). Complex organisational structure are usually associated with ineffective internal control systems (ACFE, 2016). Further, most organisations that have complex structures usually have inefficient communication networks, which provides a breeding ground for fraudsters (Acharya & Richardson, 2009). Also, some industries may be more vulnerable to fraudsters than others due to their volatile nature. According to the ACFE (2016) report, fraud is more prevalent in larger multinational corporations with complex organisational structures

compared to smaller organisations. Further, the banking and finance sector represented the highest number of fraudulent cases in 2016 (ACFE 2016), and most of the fraud originated from the accounting department (ACFE 2016). This view complements most of the cases in Table 3.2 about the 2007/2008 banking crisis.

Further, accounting and auditing standards and criminal laws are constantly changing to keep up with the dynamics and complex nature of fraudulent misconduct. Therefore, the FTT should be extended to keep pace with the increasingly complex nature of fraudulent behaviour (Schuchter, 2015).

3.8 The fraud diamond Framework (FDF)

According to Wolfe and Hermanson (2004), the FT framework's three elements (perceived pressure/incentive, opportunity and rationalisation) as a precondition for fraudulent behaviour are insufficient unless the capacity to commit the offence is present. The fraud diamond theory argues that it is the capacity (skills, expertise, organisational status etc.) of the individual that gives them the ability to create or exploit a given opportunity. The fraud diamond theory (FDF) assumes that the personal characteristics of the actor are absolutely crucial for any financial maleficence or fraudulent act. The FDF therefore takes into account the power and status of the offender in the organisation, their level of intelligence, knowledge, qualifications, expertise, experience, etc. The FDF is viewed as an extension to the FTF. Wolfe and Hermanson (2004) argue that incentive or pressure show the offender the door, opportunity leads the offender to the door, and rationalisation provides the offender with the keys. However, it is capability that enables the offender to open the door with the right keys. After all, without capabilities the offender may be using the wrong keys, ones which may not be able to open the door. In figure 3.9, I attempt to construct the silent period before fraud is committed.
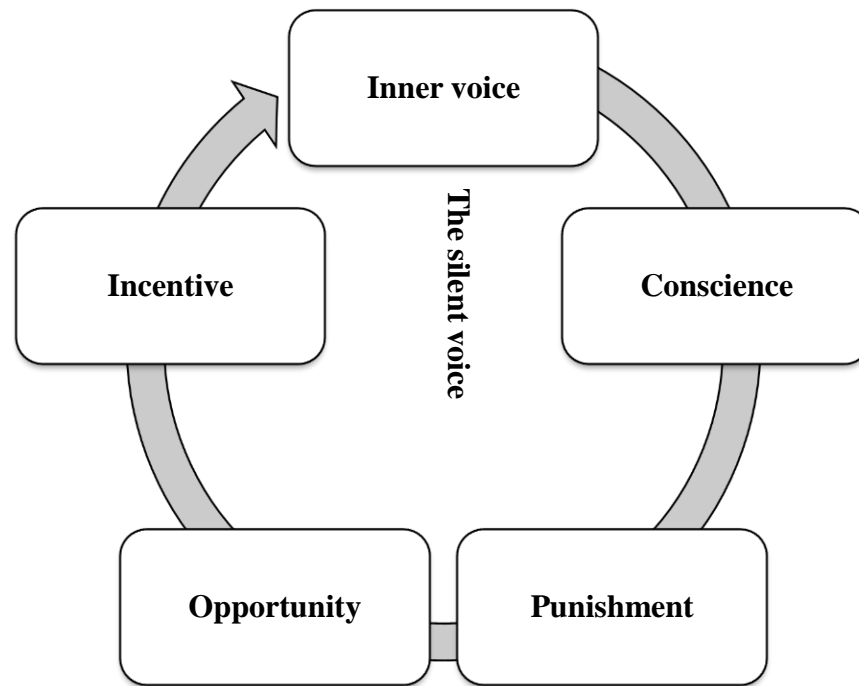
Figure 3. 9 the fraud inhibition inner voice

3.9 Application of FTF, FDF and trust pathways to largest corporate accounting scandals that caused 2007/2008 financial crisis

In this section, I contribute to the accounting literature by looking at the 2007/2008 financial crisis from both ethical and trust perspectives. Further, I use the six trust pathways to capture the dominant position of the fraudsters in committing the fraud. The table below captures the major corporate governance issues that contributed to the 2007/2008 financial crisis and the ethical standards that were breached. In each case, I use the fraud triangle to identify the motivation of the fraudster, the perceived opportunity that led to the fraud, and the possible justification used by the fraudster in committing the fraud. Further, I identify the trust pathways used by the offenders in committing the fraud. In table 3.2 I relate fraud triangle to the six dominant decision making-pathway

Table 3. 2 Largest corporate accounting scandals and the trust pathways

Corporate Fraud	Ethical issues	Theory (FTT/FDT)	Trust position
Houston based Publicly traded Waste Management Company – USA (1998)	(a) Perceived Internal control weaknesses and Earnings Management (Thakor, 2015). (b) Inefficient Audit Committee (Aldamen et al., 2012). (c) Poor Audit Quality and Fraud (Jin et al., 2011)	**Perceived incentive** - Executive compensation/bonus **Opportunity**- Weak internal control **Rationalisation** – Impressive Balance sheet to attract investors **Capacity** – CEO, Chairman and auditors	**P → D** Ethical egoism/self-interest (Low et al., 2008)
Enron Scandal (2001)	(a)Perceived Internal control weakness, inefficient audit committee, Insufficient regulatory agency oversight, poor auditing. (Coffee Jr, 2003; 2005; Soltani, 2014) (b) Unethical leadership (egoism), earnings management (Patra, 2010; Soltani, 2014). (c) US Stock market pressure (Coffee Jr, 2003; 2005; Patra, 2010)	**Perceived incentive** - Executive compensation/bonus, power and status. **Opportunity**- Weak internal control, auditors' independence, off balance sheet transactions. **Rationalisation** – Impressive Balance sheet to attract investors **Capacity** – CEO, Chairman and auditors (Arthur Andersen auditors)	**I → J –D** Unethical moral judgment based on fraudulent accounting information, (Sobral & Islam, 2013)
WorldCom Scandal (2002)	(a)Weak regulatory agency oversight and ineffective internal control (Soltani, 2014;) (b)Unethical leadership, inefficient controls and audit (Coffee Jr, 2005; Soltani, 2014) (c) lack of transparency and Disclosure (Coffee Jr, 2005; Soltani, 2014)	**Perceived incentive** – Greed, power and status. **Opportunity**- Weak internal control, Complex organisational and ownership structure **Rationalisation** – Boost growth and performance **Capacity** – CEO, CFO and auditors (Arthur Andersen auditors)	**P → J →D** Unethical corporate culture, Perceived fear of job lost by employees if they did not comply with request to falsify accounting records (Rockness & Rockness, 2005).

Corporate Fraud	Ethical issues	Theory (FTT/FDT)	Trust position
Tyco Scandal (2002)	(a)Unethical leadership (egoism), inefficient controls and audit (Coffee Jr, 2005; Soltani, 2014) (b) lack of transparency and Disclosure (Coffee Jr, 2005; Soltani, 2014)	**Perceived incentive** – Greed, Wealth and status. **Opportunity**- Weak internal control, Complex organisational structure, Foreign accounts **Rationalisation** – Social recognition and wealth. **Capacity** – CEO and CFO	**P → I → J → D** Perceived complex organizational structure and networks provides opportunities for directors to commit fraud (Skousen et al., 2009)
The American international Group AIG Scandal (2008)	(a) Inadequate Risk Management (Aebi et al., 2012) (b) High institutional shareholdings[1] (Erkens et al., 2012). (c) Internal control weaknesses and fraud (Thakor, 2015).	**Perceived incentive** - financial gains, stock market pressure **Opportunity**- Complex organisational structure, Inefficient internal control, Tone at the top **Rationalisation** – High performance **Capacity** – CEO, CFO and auditors	**P → D** Ethical egoism/self-interest influenced fraudulent behaviour (Low et al., 2008)
Anglo Irish Bank (2008)	(a)Inadequate risk management practices (O'Sullivan & Kennedy, 2010). (b) Excessive mortgage lending financed by heavy foreign borrowing (Honohan 2009 resolving Ireland banking crisis) (c) False Accounting including inflating total revenue by $1.5billion. Shareholders lost about $1 billion through panic selling	**Perceived incentive** – Poor Irish financial regulatory system, Greed, status, **Opportunity**:- Poor corporate governance, poor internal control system **Rationalisation**:- Justify growth, thus inflating revenue by $1.5billion	**P → J → D** Directors fraudulent behaviour predicated by the Perceived poor Irish financial regulatory system and inadequate risk management culture (O'Sullivan & Kennedy, 2010)

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[1] Erkens et al (2012), found that companies with high institutional investors and high financial expert on their board took more risk and had worse stock returns than other companies during the 2007/2008 financial crisis. Firms with more independent directors raised more equity capital during the crisis and invested it in debt. This led to the transfer of wealth from equity holders to debt holders. Most of these firms have to write off a huge amount of their assets (bad debt written off). Several other firms become bankrupt as a result.

Corporate Fraud	Ethical issues	Theory (FTT/FDT)	Trust pathway
Lehman Brothers (2008)	(a) Perceived Internal control weaknesses and conflict of interest (Thakor, 2015). (b) Excessive lending to the financial sector and debt underwriting (Johnson & Mamun, 2012), (c) Inadequate Risk Management (Aebi et al., 2012) (d) Aggressive interpretation of SEC rules on Collateralised Borrowings (Caplan et al., 2012)	**Perceived incentive** - financial gains, stock market pressure **Opportunity**- Inefficient internal control system, lack of audit trail **Rationalisation** – More financial gains and wealth for directors **Capacity** – CEO, CFO and auditors	**P → J →D** Perceived poor Corporate governance culture and noncompliance with the SEC rules and regulations influenced directors fraudulent behaviour (Christopoulos et al., 2011).
Bernie Madoff (2008)	a) Internal control weaknesses and fraud (Ragothaman, 2013). (b) Inefficient Audit Committee (Ragothaman, 2013) (c) Fraudulent Accounting (Stolowy et al., 2014). (d) Ponzi scheme[1](Lewis, 2012b)	**Perceived incentive** - financial gains, stock market pressure **Opportunity**- Inefficient internal control system, lack of audit trail by auditors **Rationalisation** – Help his family and save his status **Capacity** – Chairman, CFO and auditors	**P → I →J →D** Perceived trustworthiness in Madoff experience, business successes and his network groups blindly influenced investors judgment and decision choice (Stolowy et al., 2014).
Northern Rock (2008)	(a)Aggressive business model (Marshall et al., 2011) (b) Inefficient Audit Committee and Internal control (Goldsmith-Pinkham & Yorulmazer, 2010) (c) Reliance on Wholesale market for funding (Goldsmith et al 2010)	**Perceived incentive** - Executive compensation/bonus **Opportunity**- US Subprime mortgage market, Inefficient internal controls, flexible lending regulations by the FSA **Rationalisation** – High performance, growth **Capacity** – CEO, CFO	**I → J –D** Excessive optimism of extended global credit boom information influenced directors judgment to treble Norther Rock share of UK credit market(Marshall et al., 2011).

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[1] Ponzi scheme is a form of investment fraud in which returns are paid to investors from their own money or out of money paid into the business by subsequent investors rather than from the profit generated from the normal business activities. A Ponzi scheme provides a false illusion of a sustainable business to investors as long as long as most of the investors (equity holders) do not demand full repayment of their shares and are willing to believe in non-existing assets. The scheme is named after Charles Ponzi who notoriously used the technique in the 1020s.

Corporate Fraud	Ethical issues	Theory (FTT/FDT)	Trust position
Saytam (2009)	(a) Perceived Audit committee and internal controls weaknesses (Patra, 2010; Singh et al., 2010b; Soltani, 2014; Bhasin, 2016). (b) Chairman unfettered power and Unethical leadership[1] (Chen, 2010) (C)Weak regulatory agency oversight –Indian stock exchange (Soltani, 2014) (d)Disclosure/transparency (Singh et al, 2010 Saytam Fiasco).	**Perceived incentive** – Greed, financial gains and status **Opportunity**- Weak internal control, family control, weak regulatory framework **Rationalisation** – Social recognition, self-actualization and wealth. **Capacity** – Chairman, CEO and CFO	P → D Perceived self-interest and CEO Narcissism and greed led to fraudulent accounting practices (Bhasin, 2015).
Royal Bank of Scotland (RBS) 2009	(a) Purchase and sale of subprime securities (Acharya & Richardson, 2009). (b)Internal control weaknesses and earnings management (Acharya & Richardson, 2009; Soltani, 2014) (c) Billions of securitised assets channelled to the Cayman Islands to avoid tax. RBS announced £12 billion right issue to offset £5.9 billion bad loans.	**Perceived incentive**: financial gains offshore tax in the Cayman Islands to **Opportunity**- Weak financial regulatory framework, inadequate internal control systems **Capacity**: President, **Vice president**, CEO and treasurer, head of mortgage	P → J →D Perceived poor Corporate governance culture and weak financial regulatory framework provided a 'gracing ground' for directors unethical behaviour (Acharya & Richardson, 2009; Soltani, 2014)
Taylor, Bean & Whitaker (TBW) 2009	(a) Directors sold $1 billion dollar non existing mortgage to their Bankers as a security to cover up their illegal overdraft balance of $100 million. (b) Directors of TBW misappropriated approximately $1.4billion from Colonial bank mortgage (Black, 2013) Deloitte & Touche LLP is facing a $7.6 billion lawsuit for negligence over TBW bankruptcy (Houlder & Williamson, 2012)	**Perceived incentive**: - Greed, financial gains and status. **Opportunity**: Weak internal control system, **Capacity**: Chairman, CEO, CFO, auditors,	P → D Perceived greed and excessive desire to acquire wealth influenced directors decision to commit fraud (Black, 2013)

[1] CEO Narcissism and overconfidence provide CEO's with the psychological boost that they can achieve the misstated target. Further most CEO's are motivated by greed, power and status operate by ethical egoism (A normative ethical position that states that moral actors usually prioritise their self-interest)

Figure (14) below show the dominant trust positions that can be used to unfold the different positions used by fraudsters. Perception of the fraudster together with available information influences their interpretations of incentives/pressure, opportunity, judgment and decision choice.
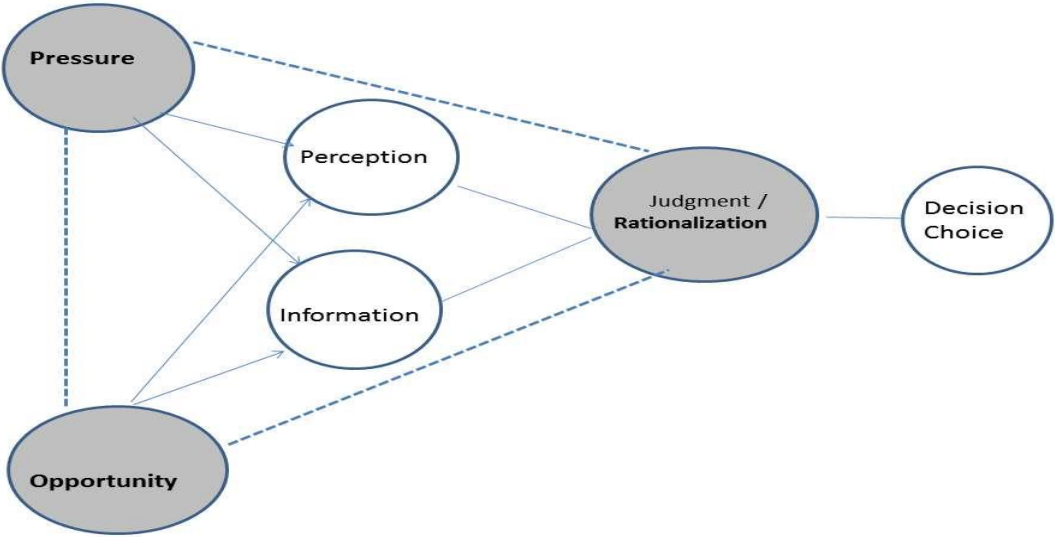
Figure 3. 10 Trust pathways linked to the fraud triangle

(Source: Authors own construction-adopted from the fraud triangle and throughput model)

3.10 The principle-based versus rule-based accounting system

A wave of corporate accounting scandals in recent years has resulted in several regulatory initiatives promulgated to strengthen audit committee oversight of the corporate reporting process and risk management (Agoglia et al., 2011). The Sarbanes-Oxley Act 2002 (SOX) passed by the US Congress in 2002 was designed to protect investors from the possibility of further fraudulent accounting practices. The SOX Act mandated strict reforms to improve the financial reporting process and disclosure by enacting the US-GAAP, which ensures that all companies comply with a set of rules and legislations. The International Financial Reporting Standards (IFRS) are predicated on the principle-based standard and the rule-based standard (Agoglia et al., 2011). The rule-based standard is distinctive in that it provides a very detailed framework and guidance for the preparation of accounts and the financial reporting process with a bright-line test (Agoglia et al., 2011). The rule-based system, on the other hand, provides a list of rules and statutory regulations that companies have to follow in the preparation of accounts and the financial reporting process. The rule-based accounting system therefore is compliance based, whereas the principle-based system is based on the principle of "comply or explain". The UK and most countries in Europe and the Commonwealth follow the principle-based accounting system. The rule-based accounting system is an integral part of the US Generally Accepted Accounting Principles (US GAAP). The proponents of the principle-based system argue that the principle-based approach is robust and flexible because it provides guidance that can be applied to various different circumstances that may arise in practice (Reddy et al., 2010). Further, unlike the rule-based accounting system, the principle-based system can cope with the rapid changes of the modern business environment (Reddy et al., 2010; Agoglia et al., 2011). For example, Agoglia *et al.* (2011) argue that the principle-based system provides solutions to the problems caused by the rule-based system because it provides limited interpretive and implementation guidance,

which stifles professional judgement. The FASB (2002) believes that less guidance increases the need to apply professional judgment consistent with the "spirit and intent of the standards". Further, critics of the rule-based system argue that the it encourages a box ticking approach to decision making and the use of legalistic loopholes to shield directors from wrong doings (Schipper, 2003). Some scholars argue that accounting scandals following Enron and WorldCom, such as Lehman Brothers in 2008 and the American International Group AIG scandal in 2008, are testimonies to the porosity and ineffectiveness of the SOX 2002 rule-based accounting system (Schipper, 2003). Further, section 108 of the Sarbanes-Oxley Act of 2002 instructs the Security and Exchange Commission (SEC) to conduct a study on the adoption of a principle-based accounting system. Schipper (2003) argues that the US rule-based system is often based on principles because the standard setters use principles in order to produce the rules for financial accounting preparers. Further, removal of the rules can reduce the numerous complexities associated with the rules as well as increase clarity (Nobes, 2005).

In contrast, the proponents of the rule-based system argue that a lack of precise rules and guidelines could create inconsistencies in the application of standards across companies. Agoglia *et al.* (2011) argue that less precise standards and rules increase concerns about the misuse of professional judgments and second-guessing in managerial decisions with associated cost. Further, they argue that preparers applying principle-based standards will be more likely to second-guess about capturing the economic substance of a transaction compared to preparers applying the rule-based accounting standards. Some critics argue that the imposition of a rule-based system increases verifiability and comparability for auditors and preparers of financial accounting (Schipper, 2003). Also, Nelson (2003) argues that the rule-based system reduces the opportunity for earnings management because there is less chance for preparers to second-guess or misuse their professional judgment.

3.10.1 The influence of the audit committee in principle-based settings

The integrity of our security market depends on the integrity of the financial reporting process by the various companies who trade in the stock market (Committee, 1999). The audit committee serves as a custodian of shareholders' and public trust in the financial reporting process. The audit committee plays a key role in the corporate governance mechanism because of its financial reporting oversight responsibilities and its role in risk management (Agoglia et al., 2011). All public listed companies in the UK are required by law to disclose information about the qualifications and expertise of their audit committee members (Council, 2012). The UK Corporate Governance Code (2016) requires all public listed companies to establish an audit committee of at least three, or two in the case of smaller companies, independent non-executive directors. The company chairman may be a member but not a chairman of the audit committee (Council, 2012). Further, the code provides that at least one of the AC members should have relevant financial experience. Some scholars argue that recent interest in IFRS is predicated on the notion of a principle-based standard rather than the US GAAP of rule-based standards (Agoglia et al., 2011). They argue that the rule-based standard typically provides what is perceived to be a more detailed implementation guidance with a bright-line test, which facilitates greater comparability. Jamal and Tan (2010) argue that the AC has less effect on reporting decisions under the rule-based system because financial preparers have to conform to detailed rules and standards in the financial reporting process. Therefore, nonconformity to the rules can lead to legal consequences (Jamal & Tan, 2010). However, under the principle-based standard, the AC is more principle-oriented; as a result, financial report preparers have to justify their choice of accounting policies and professional judgements. Agoglia (2010) posits that more experienced ACs with industry

expertise can challenge the professional judgement and aggressive financial reporting decisions under the principle-based system better than in the rule-based system. The rule-based system has developed over time because most critics argue that the rule-based standards shield financial preparers from criticisms for aggressive reporting (Benston et al., 2006). Agoglia (2010) argues that due to the inherent uncertainties of the principle-based standards, preparers applying the principle-based accounting system are more likely to perceive a greater risk of regulator sanction. As a result, there is an increasing desire on the part of the AC to raise their level of scrutiny of the financial reporting process to protect their integrity. Bédard and Gendron (2010) posit that the AC can influence corporate performance directly or indirectly. Thus, the AC can directly use their oversight role to improve the quality and integrity of the financial reporting process. Indirectly, the AC can use the internal audit, the external audit, and the internal control mechanism of the company to influence company performance (Bédard & Gendron, 2010). The AC can improve public confidence by ensuring integrity in the financial reporting process and effective corporate governance disclosure. The UK Corporate Code Guidance on Audit Committees (2012) establishes the main conditions to strengthen the effectiveness of the AC (Council, 2012). Section 2.2 of the UK Corporate Governance Code states that the AC has the responsibility to review the internal controls as well as to monitor the activities of the internal auditor (Council, 2012). Further, the AC is responsible for making recommendations to the board concerning the appointment, remuneration and terms of engagement of the external auditor (Council, 2012). Also, it is the responsibility of the AC to monitor the external auditor's independence, objectivity and the effectiveness of the audit process (Council, 2012). The UK Corporate Governance Code has therefore given the AC all the necessary authority to influence corporate performance. The AC is arguably the custodian of the conscience of the organization and

the heart of the public. Their influence on firm performance cannot be underestimated under the UK principle-based jurisdiction.

Previous studies have shown that regulators have focused on AC composition, authority and resource dimensions in an attempt to strengthen the effectiveness of ACs (Bédard & Gendron, 2010). However, fewer studies have looked at the effectiveness of the AC from the perspective of the crisis and post-crisis periods.

3.11 The UK Corporate Governance Code – a historical perspective

The UK Corporate Governance Code evolved from the reports submitted by a series of committees established to investigate the earlier abuse associated with the administration of corporate entities. The UK Corporate Governance Code provides the framework by which companies are directed and controlled (The UK Governance Code, 2016). Unlike US corporate governance, which adopts a rule-based approach with strong legal consequences, the UK Corporate Governance Code adopts a principle-based approach which provide sets of principles of good corporate governance that focus on companies listed on the London Stock Exchange (LSE). The listing rules for the LSE require every listed public company to disclose how they have complied with the UK Corporate Governance Code and explain why they have not applied the code; the code refers to it as "comply or explain". Private companies in UK are also encouraged to apply the UK Corporate Governance Code. However, unlike the case of the public companies, there is no requirement for the disclosure of compliance for private companies. The purpose of the UK Corporate Governance Code is to promote effective, efficient and prudent management systems that can facilitate the long-term success of the company. The historical background of the UK Corporate Governance Code can be linked to series of corporate governance reports such as the Cadbury Committee Report, Greenbury

Committee Report, Hampel Committee Report, Turnbull Committee Report, and the Higgs Committee Report.

3.11.1 The Cadbury Committee Report.

The premier version of the UK Corporate Governance Code was produced in 1992 by the Cadbury Committee. The Cadbury Committee was set up in May 1991 by the Financial Reporting Council, the LSE and the accountancy profession to address the financial aspects of corporate governance (Jones & Pollitt, 2004). The Cadbury Committee, which was chaired by Sir Adrian Cadbury, was a response to a major corporate scandal involving Polly Peck (a major UK company), which went insolvent after years of accounting misconduct and financial report falsifications. The Cadbury Committee Report made three key recommendations as a means of improving corporate governance. First, there should be a separate CEO and chairman for all public listed companies. Second, boards should have a minimum of three non-executive directors, two of which should have no personal or financial ties to the executives. Third, each board should have an audit committee made up of non-executive directors. The Cadbury Committee highlighted the importance of the independence of the audit committee, arguing that the board should have at least three non-executive directors who are independent from the executives within the company.

These recommendations were initially greeted with a series of controversies and dissensions by the business community in 1992. However, in 1994, the recommendations of the Cadbury Committee were appended to the listing rules of the LSE. However, companies were given the prerogative that they need not comply with the principles, however, non-compliance to the code has to be justified or explained to the stock market.

3.11.2 Greenbury Report

Following the Cadbury Committee Report in 1992, huge director's remuneration and executive compensation became a major concern to stakeholders. The Greenbury Committee (the study group on director's remuneration) was set up in January 1995 in response to shareholder and public distress about executive compensation and director remuneration. Most of this concern was caused by the rewards and incentives received by the executives of the then newly privatised utility companies. The group was chaired by Sir Richard Greenbury with the aim of identifying good practice in determining director remuneration. The Greenbury Committee code of best practice on director's remuneration brought into the limelight another important element of corporate governance, namely the responsibilities of the non-executive directors (NEDs) in managing director remuneration. The committee argued that director remuneration should be managed by a remuneration committee, which consists of NEDs with no financial interest or conflict of interest in the day-to-day running of the business, and that the remuneration committee should consist of at least three NEDs, or two NEDs in the case of small companies.

3.11.3 The Hampel Committee

The Hampel Committee was formed in 1998 with the aim of revising the UK corporate governance system. The Hampel Committee was mandated to review the code laid down by both the Cadbury and the Greenbury committees. The aim of Hampel Report was to clarify, combine and harmonise the Cadbury and Greenbury recommendations. The Hampel Committee broadly acquiesced to the fundamental principles and the recommendations provided by both the Cadbury and Greenbury reports. However, the report recognised the need to allow flexibility to enable firms' governance practice to reflect on their unique and specific circumstances. Further, the committee aimed to encourage shareholders to take a balanced view of a company's corporate governance

system rather viewing a company governance system as a box ticking exercise. As a result of the above, the committee developed a set of corporate governance systems which are more principle based rather than implementing a prescriptive rule-based system. The Hampel Committee argued that the board should not be dominated by individuals or s small group but should rather be a balance of executive and non-executive directors. Further, the report called for a transparent and formal procedure for the appointment of directors and the need for the re-elections of directors. Unlike the Cadbury and Greenbury reports, the Hampel Committee recognised the unique role of institutional investors in corporate governance. Also, it argued that to ensure good corporate governance, there should be effective dialogue between directors and shareholders.

3.11.4 Turnbull Committee

The Turnbull Committee, which was chaired by Nigel Turnbull, focused on providing internal control guidance to directors on the combined code. The report informed company directors about their obligations with regards to keeping and maintaining an effective internal control system under the combined code. Internal control is a process by which companies are directed, controlled, measured and monitored. According to the UK Corporate Governance Code (2012), it is the responsibility of directors to prevent fraud and protect the resources of the company. The internal control system is therefore a process effected by the board of directors, management and employees to provide reasonable assurance about the operations, financial reporting, risk management and compliance to rules and regulations to shareholders and other stakeholders. The main objective of the Turnbull Report was to provide guidance to the companies listed on the LSE about how to apply principle D2 of the combined code issued by Hampel (1998). The guidance in principle D2 requires the board of directors of all listed companies to maintain a sound system of internal control that can safeguard shareholders' resources (Council, 2012). Further, D21 requires directors to at least conduct an annual review of

the effectiveness of the group's internal control system and to report to shareholders. The review is expected to cover all the control systems in the organisation, including financial, operational, risk management, compliance controls etc. In summary, the Turnbull Committee recognised the relevance of internal control and risk management as key elements of corporate governance.

3.11.5 The role of the audit committee in the Turnbull Report

Even though Turnbull suggested that the responsibility for reviewing the effectiveness of the internal control rests with the board directors, in reality this responsibility is usually overseen by the AC. The audit committee is expected to examine the effectiveness, accuracy and reliability of the group's internal control system and to report to the board of directors. In doing so, it examines the risk environment of the company and evaluates how to manage the risk identified. Further, they assess the effectiveness of the prevailing internal control system in managing those risks by identifying their strengths and weaknesses. Based on their findings, they then consider the best alternative course of action to improve the group's internal control system. The Turnbull Committee Report provided an explicit promotion of the important role of the audit committee as the key custodian of the internal control systems of companies. The previous committees (Hampel, Cadbury and Greenbury) did not place such an emphasis. Reviewing internal control involves huge levels of specialist knowledge and experience. Therefore, the knowledge and experience of the AC members about the organisation (control environment, control activities, risk etc.) are very crucial. However, in reality well-qualified ACs with financial expertise are scarce. Further, most ACs tend to lack day-to-day knowledge about the entity they are meant to oversee because they are not permanent directors of the company (Zaman, 2001).

3.11.6 Higgs Committee

Following on from the Turnbull Committee Report, in April 2002 Derek Higgs (Secretary of Trade and Industry) was appointed to review the role of non-executive directors. All the previous committees on corporate governance acquiesced to the prominent role of the non-executive directors in ensuring effective corporate governance. Therefore, the Higgs Committee was mandated to elaborate on the key roles of the audit committee. The Higgs Report provided elaborate guidance about the role of NEDs. The Higgs Report distinguished the role of the board of directors from that of the chairman and the role of the chairman from that of the chief executive. The role of the NED includes challenging and contributing to the development of the company strategy, scrutinising the performance of management in meetings, and bringing an objective, fresh pair of eyes into all board deliberations. Further, the Higgs Committee stated that it is the responsibility of the chairman to lead the board in all meetings and also to ensure effective communication with shareholders. Higgs stated that the role of the chief executive and the chairmen should be separate, and that the division of responsibilities should be stated in writing. The chief executive is responsible for the day-to-day running of the company. The Higgs Report also set out the duties of the various sub-committees, including the remunerations committees, the nominations committee etc.

3.12 The Combined UK Corporate Governance Code

The UK Corporate Governance Code, formerly the Combined Code on Corporate Governance, provides guidance towards the behaviour of the board of directors and sets out good practice in relations to issues such as leadership, effectiveness, accountability, remuneration and relationships with shareholders. The code was recently amended in June 2016, with these amendments being effective for periods commencing 1st June 2016.

The guidance for leadership in the code states that the position of the chairman and the chief executive should be separate and that their respective roles should be in writing. The guidance on leadership advocates regular board meetings and the need for NEDs to apply scepticism in order to challenge and scrutinise directors effectively. In June 2016, the Financial Reporting Council (FRC) issued revised guidance on the UK Corporate Governance Code, including revised guidance on the audit committee, the ethical standards 2016, the EU audit regulations and directives, and the revised international auditing standards. The key elements of the UK Corporate Governance Code 2016 include the following:

Effectiveness Guidance on effectiveness requires NEDs and other executives to have the right skills and experience and the board to be the right size. Further, the code requires a balance of non-executive directors and executive directors on the board. Also, there is a provision on transparency with regards to board appointments, election, re-elections, selection procedures, director's remunerations, etc. The guidance requires all directors to receive induction upon joining the board and they should regularly refresh and update their knowledge and skills. Further, the code requires all individual directors and committee members to undertake a formal and meticulous annual evaluation of their performance. Further, the code states that all information relevant to the board for the effective discharge of their duties should be provided on time.

Remunerations The code on remuneration requires that the board of directors should provide a remuneration package which can attract, retain and reward the right calibre of directors capable of meeting the company's objectives. In addition, director remuneration should be set in line with corporate performance and be designed to reward and promote the long-term success of the company. The code states that there should be a formal and transparent procedure for the design of remuneration packages for individual directors

and that no directors should be involved in deciding their own remuneration packages. The new provisions on director remuneration in the code (June 2016 UK Corporate Governance Code) allows the company to withhold the performance-related pay of directors or claw back remuneration in situations of poor performance by the company.

3.13 Audit committee

The audit committee (AC) represents a key element of the corporate governance mechanism because of their monitoring and oversight responsibility of the financial reporting process (Blue Ribbon Committee, 1999). Further, as custodians of the internal control systems of the company, the AC plays a crucial role in fraud prevention, ensuring that the company complies with rules and regulations and disclosure requirements. The Institute of Internal Auditors (IIA) defined the audit committee as:

"*The governance body that is charged with oversight of organisation's audit and control functions*".

It is a requirement of the UK Corporate Governance Code 2006 and the US Sarbanes-Oxley Act 2002 for all publicly traded companies in both the UK and the US to have an AC. The Blue Ribbon Committee (BRC) recommended that the AC should be composed entirely of non-employee directors of the company (BRC, 1999). Non-employee AC members may view the AC service as a means of enhancing their social and reputational capital (Fama and Jensen, 1983). The duties and responsibilities of the audit committee can be broadly classified under oversight and monitoring.

3.13.1 Oversight responsibilities of the AC

The AC is primarily charged with oversight responsibility over the financial reporting process. To achieve this objective, the AC relies on the internal auditor and the external auditor in the implementation of their oversight responsibilities. For example, it is the responsibility of the AC to oversee the recruitment, selection, appointment, remuneration and execution of the external auditors' duties and responsibilities. The AC is thus involved throughout all the stages of the external auditors' functions, that is, before their appointment, during the performance of their functions, and after they leave the company. It is the responsibility of the AC to ensure financial reporting quality and the effective disclosure of both financial and non-financial transactions. Further, the AC is charged with the responsibility to oversee the effective performance of the internal audit functions. The AC is responsible for assessing and reviewing the adequacy and effectiveness of the company's internal control systems. To achieve this responsibility, the AC utilises the skills and expertise of the internal auditor by agreeing to the scope of its work as well as its priorities and resources. The AC reviews and approves the internal audit (IA) remits and ensures that the internal auditor is free to work independently and objectively. Further, it is the responsibility of the AC to provide the necessary resources and support for the internal auditor to perform their duties effectively. Further, it is the responsibility of the AC to ensure that the company complies with all relevant rules, regulations and ethics. The AC discusses regulatory compliance risk and other risk factors affecting the company with the board of directors. Further the AC is charged with the oversight responsibility of assessing and reviewing the internal control systems at least once a year.

3.13.2 The monitoring role of the AC

The audit committee serves as a fresh pair of eyes that monitors the activities and behaviour of directors on behalf of the owners. Under the revised Corporate Governance

Code (2016), one of the key responsibilities of the audit committee is to monitor the integrity of the financial statement of the company and the associated disclosures. For example, in the principle-based system of "comply or explain", a company is required to confirm that it has complied with the provisions of the code as well as all relevant rules and regulations. It is the responsibility of the AC to monitor and review all related information presented with the financial statement regarding compliance. Further, it is the responsibility of the AC to monitor the process by which the financial statements and other information are produced, including accounting policies adopted and the basis for making significant financial reporting judgments. Further, internal control (ICO) is a formidable tool used by the AC to monitor the financial reporting process. The AC needs to ensure that the IC is in place and is adequate and effective. This objective is achieved by the AC interacting with the TMTs external auditors and all those charged with governance.

3.13.3 Audit committee effectiveness under Sarbanes-Oxley 2002

According SOX 2002 section 301, the US stock exchange is prohibited from listing the security of any issuer that is not in compliance with the standards regarding the audit committee. The SEC has asserted that maintaining effective oversight on internal controls, compliance with rules and regulations, and the financial reporting process is vital for all publicly traded companies. Under section 301 of SOX 2002, each audit committee of listed companies is directly responsible for the appointment, compensation and oversight of all external auditors. Further, these are to report directly to the audit committee regarding their findings and recommendations. In furthering the objective of financial reporting quality, transparency and disclosure, SOX 2002 requires all listed companies to have at least one financial expert on the audit committee. Under the SEC rule, the audit committee financial expert (ACFE) is an individual who possesses the following characteristics which may have be obtained through education, and or

experience. To qualify as an ACFE, the individual should have a good understanding of the generally accepted accounting principles (GAAP) and financial statements. Secondly, the individual should be able to assess the applicability of GAAP in relation to the financial statement of the company which they serve. Thirdly, the individual should have any or all of the following attributes: supervisory experience, auditing experience, and the ability to analyse and evaluate the financial statement and other related financial or accounting statements. Fourthly, the individual should be able to understand the internal controls and the procedures for preparing the financial statement. Finally, the individual should be able to understand the duties and responsibilities of the external auditor and the audit committee. Some scholars argue that SOX 2002 increased the responsibility and effectiveness of the audit committee. It raised AC membership to include more independent directors. It also increased the level of accounting and financial skills and expertise required by the AC. Further all listed companies are now required by the UK Corporate Governance Code to disclose the background and qualifications of their audit committee members stating their level of financial expertise. Other scholars, however, argue that the AC is still ineffective post-SOX 2002. Some studies show that the presence of the AC on the board does not stop fraud (Beasley et al., 2009).

3.13.4 Audit committee effectiveness under the UK corporate governance system

Provision C.3.1 of the UK Corporate Governance Code requires all listed companies in the UK to establish an audit committee composed of at least three independent non-executive directors (NEDs), or two in the case of smaller companies. In smaller companies the chairman of the company may be a member of the AC, but not the chair of the AC, provided that they satisfy the criteria of independent director. The UK Corporate Governance Code requires that at least one member of the AC should have recent and relevant financial experience. Further, the code requires the AC as whole to

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have the expertise and competence relevant to the sector in which the company operates. Similar to SOX 2002, the key responsibilities of the AC under the UK Corporate Governance Code includes monitoring the financial integrity of the company financial reporting system, reviewing the company's internal control system, overseeing the external audit appointment and functions, and monitoring and reviewing the effectiveness of the internal audit functions of the company. The UK Corporate Governance Code provision C.3.1 on ACs is predicated on the conventional wisdom that AC independence and financial expertise can enhance the monitoring and oversight of management to avoid aggressive financial reporting choices (Agoglia et al., 2011).

3.13.5 Audit committees and accounting irregularities/earnings management

Financial reporting provides an essential source of information to the capital market and other key economic agents. Opportunistic earnings manipulations by directors undermines the purpose of financial reporting by distorting the true and fair economic performance of companies (Datta et al., 2013). The AC is charged with the responsibility of overseeing and monitoring the financial reporting process in order to constrain opportunistic financial reporting process by directors (Demerjian et al., 2012; Badolato et al., 2014a; Soliman & Ragab, 2014). Earnings management (EM) is the act of purposefully manipulating or influencing the financial reporting process with the objective of obtaining personal gains (Schipper, 1989). EM enables directors to alter financial reports to give a misleading picture about the company performance to stakeholders. In this study, I use EM and accounting irregularities interchangeably because I assume that the primary objective for engaging in accounting irregularities is to influence the financial reporting process to achieve private gains (Badolato et al., 2014a). Most scholars argue that EM is a widespread but "too little challenged custom" among multinational companies around the globe (remark by Chairman Arthur Levitt, SEC;

retrieved 14 January 2014). EM is usually motivated by pre-determined targets such as a preference for more stable earnings (income smoothing) or the desire for management to maintain a certain level of accounting ratios. The motivation for earnings management can be internally or externally driven. Internally motivated EM is predicated by self-interest and the opportunistic behaviour of directors such as a desire for bonus, high salary, promotion, greed, personal wealth. Further, external forces such as intense competition and pressure from the stock market can influence directors to manipulate the earnings of the company. Some financial experts argue that most corporate directors, audit committees and auditors are participants in the earnings management game (Arthur Levitt speech at the School of Law and Business, 1998). The AC faces two major challenges in constraining fraudulent activities and EM Firstly, EM is mostly perpetrated by TMTs with high status and power in the company, therefore the ability of the AC to constrain EM will depend on the status and power of the AC (Badolato et al., 2014a). Secondly, constraining accounting irregularities poses a significant challenge to the audit committee because directors hide EM from monitors due to the fear of reputational damage or severe penalties for deliberately violating GAAP (Schrand & Zechman, 2012; Badolato et al., 2014a).

3.14 The effectiveness of the audit committee

Dezoort *et al.* (2002) posit that an effective audit committee should have qualified members (members with relevant financial expertise) with the relevant resources and authority to protect stakeholder interest. Further, the AC should be capable of ensuring reliable financial reporting, internal controls, and risk management and of applying due diligence in their oversight responsibilities (DeZoort et al., 2002). Dezoort *et al.* (2002)

highlighted four fundamental determinants of the effectiveness of the AC, namely composition, authority, resources and diligence.

In figure 3.11 below I provide the four key factors that determines AC effectiveness in most firms in a diagrammatic form. In the middle of all these four components is trust. Trust is the pivot upon which these four components rotates. Trust is the gateway for superior information sharing. Further trust promotes teamwork as well as enhances the cognitive capabilities and proficiencies of the AC.
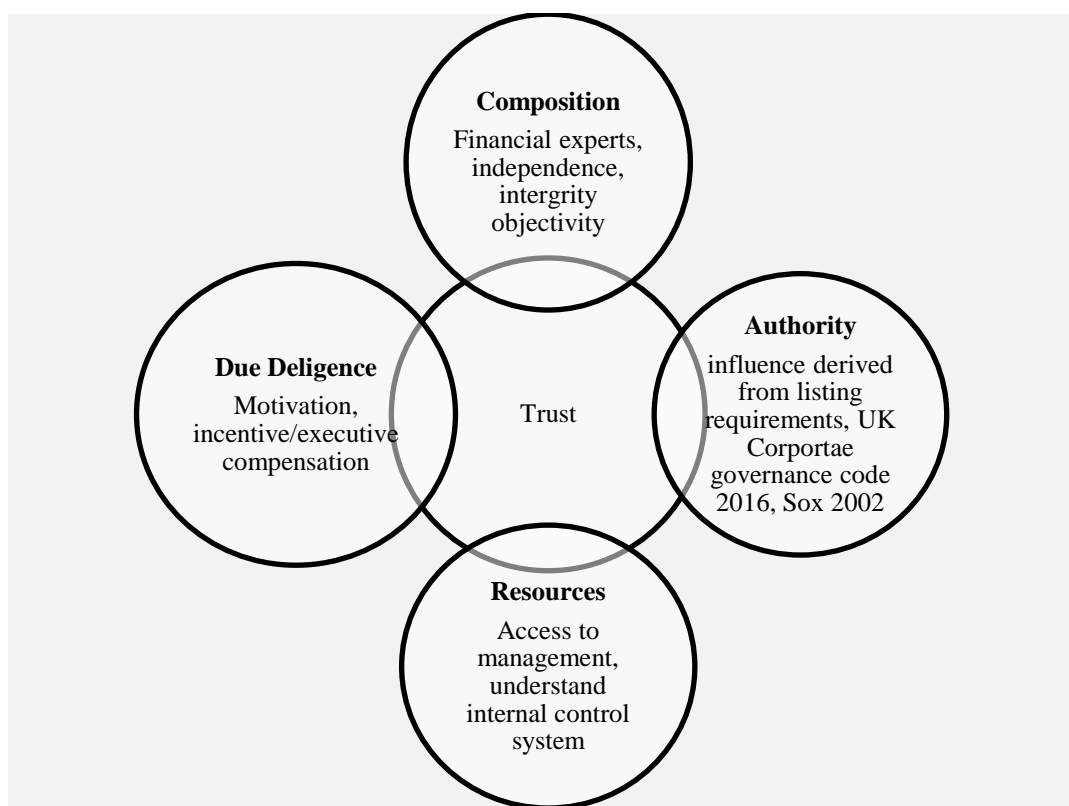
Figure 3. 11 Determinants of AC effectiveness

(Adopted from Dezoort *et al.*, 2002)

3.14.1 Audit committee composition

The Sarbanes-Oxley Act 2002 and the UK Corporate Governance Code 2016 require that the ACs of all public listed companies be composed of at least there independent directors, one of which should be a financial expert. Thus, a simple insider/outside independence dichotomy is inadequately analogous to AC effectiveness. Most stock exchanges are in the process of further strengthening their AC listing requirements as a result of the

2008/2009 global financial crisis (DeZoort et al., 2002). For example the New York Stock Exchange NYSE is considering tighter AC independence and more robust AC responsibilities which include reviewing financial press releases and communication with the stock exchange and industry analysts (DeZoort et al., 2002). Further, the group dynamics of the AC play a crucial role in AC effectiveness. More dominant AC members with limited financial expertise or experience can override discussions during decision making. Alternatively, the AC may rely too heavily on a member with the highest level of financial expertise. These team conflict requires an experienced financial expert to serve as a chairman of the AC (DeZoort et al., 2002; DeFond et al., 2005; Aldamen et al., 2012)

3.14.2 Audit committee authority

The authority of the audit committee plays a formidable role in the performance of its duties (DeZoort et al., 2002; DeFond et al., 2005; Aldamen et al., 2012). ACs mostly derive their authority from two main sources, namely internal sources and external sources. Internally, the AC derives its authority from the board of directors and the shareholders. In most cases the AC serves as custodian in the interest of the shareholders who appoint them to protect their interest. Further, AC authority is influenced by its relationship with the board of directors, senior management, internal auditors and external auditors. A good relationship which is predicated on mutual trust, objectivity and professional integrity can have a positive influence on AC effectiveness. On the other hand, the AC also derives its authority from legislations such as SOX 2002, stock exchange listing requirements, and the corporate governance code.

3.14.3 Resource capability of the firm

The effectiveness of the audit committee oversight responsibility is contingent upon the availability of resources to do the job. This resource component includes adequate communication systems (IT infrastructure of the firm) and the size of the AC (the

NACD's Blue Ribbon Commission on audit committee [NACD, 2000] suggested that the AC should composed of between three and six members). Further, the AC should have access to other corporate governance groups including the external auditors, internal auditors, and legal counsel. The AC should also have access to accurate, timely, and relevant up to date information that is necessary to help them execute their duties responsibly and effectively (DeZoort et al., 2002).

3.14.4 Due diligence

The first three elements (composition, authority and resources) form the basic components for AC effectiveness, while due diligence constitutes the process factor that enables AC to achieve effectiveness (DeZoort et al., 2002). Due diligence in this context refers to the application of professional scepticism in the performance of their duties. Scepticism comes from a Greek origin *skeptikos* meaning "inquiring or reflective"(Glover & Prawitt, 2014). This implies that the AC should have a questioning mind, use careful observations, probing reflection and suspension of belief in performing their oversight duties (Glover & Prawitt, 2014). The extant accounting literature includes numerous calls for AC due diligence (DeZoort et al., 2002; Beasley et al., 2009; Glover & Prawitt, 2014). For example the Blue Ribbon Committee Report recommended that the AC meet at least quarterly to discuss the financial reporting quality with the external auditor. Further, the AC should promote a culture of professional scepticism by challenging the judgment of both management and auditors by encouraging all parties to approach their duties with a probing and reflective mind set (DeZoort et al., 2002; Glover & Prawitt, 2014; Kang et al., 2015).

3.15 Audit committee effectiveness and the six trust pathways

The credibility of the entire financial reporting infrastructure and the quality of corporate governance mechanism revolves around the credibility and financial integrity of the audit

committee (Farber, 2005). The extant accounting literature acquiesces to the role of the audit committee as the custodian of investors' trust. However, the 2008 global financial crisis significantly dented the trust invested in auditors and the entire corporate governance mechanism. The agency theory (e.g. Fama and Jensen, 1983) posits that the audit committee is vested with a responsibility to monitor and oversee the activities of management, which otherwise may act in their self-interest or engage in opportunistic behaviour. Further, the stewardship theory assumes that managers are honest and can be trusted with the responsibility to manage the organisational resources profitably. The institutional theory emphasises the ceremonial role of the audit committee as the independent legitimate overseer of the financial reporting system. The resource-based view asserts that resource acquisition, utilization and distribution should be monitored by the audit committee. I therefore argue that the agency theory, institutional theory, stewardship theory, and resource-based view all place the audit committee and the entire corporate governance mechanism in a position of trust (Beasley et al., 2009). However, the extant accounting literature has not yet examined the trust pathways that can influence AC decision making. Most research on ACs examines the relationship between AC inputs (e.g. expertise, independence or diligence) and abnormal accruals (Beasley et al., 2009). AC members are human beings, they are not machines. AC members have their own perception/world view about their responsibilities in the organisation. The perception of the AC members is influenced by the type of information available to them. Further, the judgment and decisions of the AC are influenced by the interrelationship between their perception and type of information (Rodgers, 2010a). The managerial hegemony adduces that directors usually surround themselves with trusted friends and "cronies" (Beasley, Carcello *et al.*, 2009). I argue that understanding the different trust positions used by the AC in decision making is a vital step in examining the effectiveness of the AC oversight responsibilities.

Rodgers (2010) asserts that the throughput model (TPM) integrated into decision making paradigms can serve as a useful pathway in tracking down trust behaviours in the corporate governance mechanism. He argues that the trust pathway revolves around four key decision making elements that include perception (P), information (I), judgement (J) and decision choice (D). The TPM views trust as a normative or psychological cognitive contract that clarifies the different trust pathways used by decision makers in making decisions. In TPM **perception** (problem framing) involves the process of using pre-formatted knowledge to guide their search for confirmation or rejection of incoming decisions (Rodgers, 2010a). **Information** involves new sets of available data, technology, knowledge, etc. that confirm or challenge the perception of the decision maker. The **judgement** stage involves the process of analysing the available information; however, it is the perception of the decision maker that guides the level of analysis at the judgment stage. Rodgers (2010) argues that the judgement stage is usually bedevilled with different types of biases. In TPM, the **decision making** stage is a product of the interrelated cognitive process (perception, information, judgement) that can be captured by the trust position adopted by the decision maker in arriving at the decision. Based on Figure 3.12 I can establish six possible trust pathways that can be used to understand the decision making process of the audit committee.
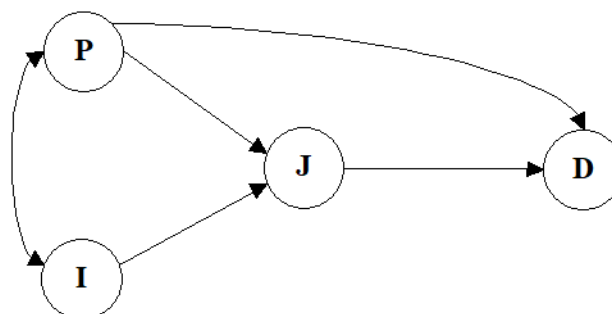
Figure 3. 12 the six dominant AC decision making pathways

Where P = perception, I = information, J = judgment, and D =decision choice.

3.15.1 The self-interest-motivated AC decision making pathway

P→D: In this trust pathway the audit committee activities and behaviour are influenced by their self-interest and individual opportunistic intentions.

3.15.2 The rule-motivated AC decision making pathway

P→J→D: In this trust pathways the audit committee believes that they can achieve better results if rules are strictly followed.

3.15.3 The category-based AC decision making pathway

I→J→D: In this trust pathway, the audit committee activities and work ethics are influenced by their social networks, experience, tradition, educational background, customs, culture, religion, and so forth.

3.15.4 The third party-motivated AC decision making pathway

I→P→D: In this pathway the audit committee activities and behaviour are influenced by the people around them and other influential third party agents such as the media.

3.15.5 The role-based AC decision making pathway

P→I→J→D: In this pathway, the audit committee activities and behaviour are influenced by formal societal structures and sometimes a domineering and powerful CEO or chairman.

3.15.6 The experienced-based AC decision making pathway

I→P→J→D: In this pathway the audit committee is believed to have acquired enough knowledge, power and experience to better monitor and oversee the financial reporting process. In this pathway, the AC has all or most relevant information to effectively monitor and reduce fraudulent activities in the organisation.

Each of the above pathway may affect corporate financial performance and value in varieties of ways depending on the nature of business and other external factors. This study provide empirical evidence about the effect of AC attributes such as educational background (accounting certified expertise, finance expertise), experience etc. on corporate financial performance and value. AC is one important corporate governance mechanism that have huge impact on corporate strategy formulation and implementation (DeZoort et al., 2002; DeFond et al., 2005; Beasley et al., 2009). Further, AC oversight and monitoring responsibility are crucial to value creation (Beasley et al., 2009) and financial reporting integrity (Klein, 1998; DeFond et al., 2005). Therefore understanding the different decision making positions of the AC is crucial for organisations ability to create wealth. Table **3.3** below attempt to provide conceptual overview about the different AC trust decision making positions and their implications to the corporate governance system.

Table 3. 3 AC decision making pathways

Pathway	Trust position	Corporate Governance Provision	Theoretical underpinning
P→D (Trust as rational choice)	In this pathway, AC is made up of members with high expertise and experience. The high level of expertise and experience of the AC enables them operate independently with little or no influence from the managing director.	To ensure trustworthy behaviour both Sarbanes Oxley 2002 and the UK corporate governance 2016 requires AC of all listed companies to have at least one finance expert on the board.	**Agency theory** implies that AC will use their expertise and experience in the interest of the investors and serve as custodians of public trust. AC play a key role in reducing agency cost(Dhaliwal et al., 2010)
P→ J→ D (Trust govern by Rules)	In this pathways AC is trusted as part of their oversight responsibility to monitor the internal control and the financial reporting quality of the organisation. In this pathway, AC follow procedures, standards, rules and organisational norms to guide their decision making process	To improve investors trust after the global financial crisis, the UK and US corporate governance strengthen the oversight responsibility of AC to include monitoring organisational compliance to relevant legislations, rules IFRS, internal controls, risk assessment etc.	**Resource based view (RBV) and** knowledge based view (KBV) of organisational theory implies that AC in each organisation have the relevant unique and valuable technical and financial expertise to monitor their organisational internal control system.
I→ J→ D (Trust based on reputation)	AC members usually belong to a social class and a network group with high level of reputation. Members from this network group mostly share some common experience, education background, tradition etc. AC perception is influenced by the power relationship (dominant political culture) that exists within the organisation and their social network group. AC trust behaviour in this pathway is guided by the fear of damaging their reputation.	Corporate governance requires listed companies to disclose the relevant financial qualifications and experience of each AC member. Most AC members have professional qualifications and experience of serving on the board of other companies.	**Institutional theory** implies that organisations are dynamic entities that can acquire specific reputation over the years based on their ethical stance. For example Doctors, lawyers and accountants are respected in the society due to their institutional reputation.

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Pathway	Trust position	Corporate Governance Provision	Theoretical underpinning
I→P→D (Third-party based trust)	AC decision making is shaped by the informal structures the type of information collected from their 'trusted peers'. AC members perception is influenced by the dominant logic within their network group	Both US and UK corporate governance requires all listed companies to set up AC that is made up of independent non-executive directors. However, the power structure in organisations and the influence of 'trusted peers' can adversely effects AC decisions.	**Managerial hegemony theory** implies that managing directors usually surround themselves with their cronies.
P→I→J→D (Role-based trust)	AC decision making is govern by their perception about the organisational culture (dominant logic) and the organisational environment. Their perception influences what type of information to accept or reject when making judgment and hence decision.	Both UK and US corporate governance provide the AC with power and legitimacy to ensure transparency and financial reporting integrity. The AC symbolic legitimacy can lead to effective questioning of management and monitoring of trust behaviour	**Top echelon theory** signify the symbolic ceremonial role of the power and influence of the AC in the decision making process of the board.
I→ P→ J→ D (Knowledge based trust)	In this pathway, AC decision making is influenced by their level of accumulated knowledge about the organisation and experiences acquired over the years about the organisation or from previous similar organisation. Knowledge (superior information) transfer can influence auditors professional scepticism and decision choice (Rodgers et al., 2017).	The UK and US corporate governance make provision for the appointment of an experience and qualified financial expert to head the AC.	**Resource dependence theory** predicate that AC providing valuable expertise and advice in a variety of strategic areas. AC members usually have high expertise level and experience that can influence the decision making process of the board (Dhaliwal et al., 2010)

3.16 Theoretical frameworks and hypothesis formulation

The theoretical underpinning to chapter three includes; institutional theory, legitimacy theory, stewardship theory, resource dependency theory, stakeholder theory, information asymmetry theory, stewardship theory, and throughput decision making theory.

3.16.1 Legitimacy theory

The legitimacy theory implies that organisations are part of a broader social system with no inherent rights to resources. Further, it is the society that can "confer" a state of legitimacy upon the organisation (Deegan, 2002). Therefore, to achieve growth and sustainability it is imperative that directors protect the interests of shareholders as well as the interests of other stakeholders (Deegan & Blomquist, 2006; Harrison & Wicks, 2013). Agency theory suggests that management may not always act in the interests of the shareholders. Legitimacy theory implies that unsatisfied shareholders or stakeholders will not have the capacity and capabilities to legitimise the activities of directors. To deal with this agency problem, the board delegates the AC to oversee the activities of the firm and monitor the financial reporting process (DeZoort et al., 2002). The legitimacy theory is a branch of political economy theory which explains the power of conflict that exists within society and the different levels of struggles that occur between various groups within society. Guthrie and Parker (1990) argue that in the political economy, accounting reports are perceived as a rhetoric to maximise the economic self-interest of directors and perhaps shareholders. In contrast, CSD is perceived in the political economy as a mechanism that communicates trust to the wider stakeholders (Guthrie & Parker, 1989).

3.16.2 Social contract theory

Some scholars argue that ACs serve as custodians of public trust in the financial reporting systems of companies (Rezaee, 2004; Farber, 2005; Holm & Zaman, 2012). An increasing level of financial malfeasance by high profile companies coupled with the collapse of

major companies due to financial statement fraud and related audit failure have eroded public trust in the financial reporting process (Lins et al., 2017). For example, the collapse of major companies, such as Enron, WorldCom, Lehman Brothers, and Saytam, is a violation of the social contract. The social contract theory is predicated on the notion that organisations cannot exist in isolation from society (Deegan, 2002). Therefore, organisations are confronted with two main forms of social contract, namely the explicit contract and the implicit or psychological contract (Matthijs Bal et al., 2010). The explicit contract involves physical contracts that exist between the organisation and its agents, such as employees, creditors, customers, and suppliers. The implicit contract, however, is more psychological in nature and requires the organisation to respect the social conscience (the rules, norms, traditions, culture, etc. of the society). Organisations that conduct activities that violate the social contract can face devastating consequences (Deegan & Blomquist, 2006; Artiach et al., 2010). In contrast, organisations whose activities are governed by a social conscience are rewarded (Artiach et al., 2010). Therefore, most organisations use CSD as a strategic armoury to legitimise their activities and communicate trust to their shareholders (Deegan & Blomquist, 2006; Michelon & Parbonetti, 2012).

3.16.3 Stakeholder theory

The stakeholder theory implies that firms are involved in a set of complex relationships between conflicting interest groups which can affect or be affected by the activities of the firm (Parmar et al., 2010). The prior literature on corporate governance and sustainability management research has relied on the stakeholder theory. The stakeholder theory and CSD share a similar goal because both concepts extend the views of the firm beyond maximising the short-term shareholder value or accounting-based profit (Hörisch et al., 2014). The stakeholder theory and CSD share a broader understanding of dependencies, embeddedness, social obligations, environmental obligations, and so on. (Freeman et al.,

2004) posit that in most societies, stakeholders do not act in a vacuum but rather incorporate according to a set of values. Further, based on these values, stakeholders usually negotiate to create mutual interest (Hörisch et al., 2014). Anchoring sustainability (environment, social, governance) in the mind-set of all stakeholders can be considered as the most powerful and immediate step to reducing the stakeholder conflicts faced by most firms (Hörisch et al., 2014). Therefore, I argue that CSD is a mechanism that communicates mutual sustainability interest to the stakeholders of the firm.

3.16.4 Information asymmetry theory

Financial statement information and the timely disclosure of relevant information is crucial to investors and market observers. Information asymmetry implies that directors mostly have access to relevant, adequate and timely information in comparison to the shareholders who own the business. These asymmetry therefore creates an imbalance of power in transactions, which can enable directors (agents) to prioritise their self-interest over the interests of their principals or shareholders (Jensen & Meckling, 1976; Fama & Jensen, 1983a). Investor perception of a firm is influenced by the quality of accounting information (Klein, 2002; Ball, 2013) and corporate sustainability disclosure (Deegan & Blomquist, 2006; Porter & Kramer, 2011; Michelon & Parbonetti, 2012; Cheng et al., 2014a). It is part of AC oversight responsibility to promote financial reporting integrity (DeZoort et al., 2002; Dhaliwal et al., 2010; Aldamen et al., 2012) and ensure that the company complies with relevant legislations regarding the adequate disclosure of all relevant information to investors and other stakeholders (Rusinko & Matthews, 2008; Nordin & Hamid, 2013; Martinez-Ferrero et al., 2015; Gnanaweera & Kunori, 2018).

3.16.5 Institutional theory

The institutional theory implies that most organisational activities reflect a behavioural pattern that has evolved over time and has become legitimised within the organisation and its environment (Eisenhardt, 1988). The effectiveness of the AC can be influenced by the prevailing culture within the firm, which includes institutional norms, company policies, procedures, rules, and routines (DeZoort et al., 2002). Turley *et al.* (2007) posit that AC effectiveness is influenced by two major cultural elements in the organisation, including formal power structures (written policies, rules, routines, code of behaviour, policies, procedures etc.), informal power structures including the informal relationship between the AC and the other corporate governance agents (board members, management, internal auditors, external auditors etc.) (Bruynseels & Cardinaels, 2013; Beck & Mauldin, 2014). The power structure relates to the ability of the AC to influence others or be influenced by others (DeZoort et al., 2002).

3.16.6 Corporate sustainability disclosure and stakeholder trust

According to the stakeholder theory, it is the responsibility of directors to disclose information about the sustainability of their organisations as part of their corporate social responsibilities (CSR) (Michelon & Parbonetti, 2012). Providing stakeholders with corporate sustainability information about firms build their trust in the corporate governance system of the firm (Mayer et al., 1995; Schoorman et al., 1996; Rodgers, 2010a).The sustainability disclosure provides reports about the economic, environmental, social and governance performance of the organisation (Michelon & Parbonetti, 2012). Following Michelon *et al.* (2011), I use the Bloomberg sustainability index score (BSIS) to measure the sustainability of the FTSE companies in the sample. Michelon and Parbonetti (2012) argue that most orgarnisations use CSD as a corporate governance mechanism to legitimise their behaviour as well as improve the relationship between the

orgarnisation and its stakeholders. In furtherance to the above argument, Adam *et al.* (2007) posit that CSD is a means by which companies communicate their values, capabilities, aspirations and strategies to their stakeholders. The perception of society about firms' reputations is governed by the extent and quality of their CSD (Michelon, 2011; Michelon & Parbonetti, 2012). Hence, there is a positive association between CSD and firm performace (Adams & Larrinaga-González, 2007). The agency theory implies that the agents (directors) have a responsibility to account for their stewardship to the principal or shareholders (Jensen & Meckling, 1976). The AC plays a prominent role in making sure that the TMT complies with the corporate governance disclosure and CSD requirements. The AC oversight role particularly enhances directors' effectiveness in monitoring management activities and the entire financial reporting process (Beasley et al., 2009; Aldamen et al., 2012; Barka & Legendre, 2017). In pursuing their oversight and monitoring role, an effective AC helps in reducing the information asymmetries between management and stakeholders by influencing the board to comply with CSD requirements (Li et al., 2012). Further, the stakeholder theory posits that corporate governance sustainability disclosure by the board can serve as a complimentary mechanism of legitimacy that can be utilized by firms to build a dialogue with their stakeholders (Michelon & Parbonetti, 2012).

3.16.7   Corporate sustainability disclosure and legitimacy theory

The legitimacy theory implies that organisations are part of a broader social system with no inherent rights to resources. Further, it is the society that can "confer" a state of legitimacy upon the organisation (Deegan, 2002). Therefore, to achieve growth and sustainability, it is imperative for directors to provide accountability of their activities to their stakeholder. The legitimacy theory is a branch of political economy theory which explains the power of conflict that exists within society and the different levels of

struggles that occur between various groups within the society (Guthrie & Parker, 1990). Guthrie *et al.* (1990) argue that in the political economy accounting reports are perceived as a rhetoric to maximise the economic self-interest of directors and perhaps shareholders. In contrast, CSD is perceived in the political economy as a mechanism that communicates trust to the wider stakeholders (Guthrie & Parker, 1989). The idea of legitimacy can be directly related to the concept of the social contract (Deegan, 2002). The social contract theory is predicated on the notion that organisations cannot exist in isolation from society. Therefore, organisations are confronted with two main forms of social contract, namely the explicit contract and the implicit or psychological contract (Matthijs Bal et al., 2010). The explicit contract involves physical contracts that exist between the organisation and its agents, such as employees, creditors, customers and suppliers. The implicit contract, however, is more psychological in nature and requires the organisation to respect the social conscience (the rules, norms, traditions, culture etc. of the society). Organisations with activities that violate the social contract can face devastating consequences (Deegan & Blomquist, 2006; Artiach et al., 2010). In contrast, organisations whose activities are governed by the social conscience are rewarded (Artiach et al., 2010). Therefore, most organisations use CSD as a strategic armoury to legitimise their activities and communicate trust to their shareholders (Deegan & Blomquist, 2006; Michelon & Parbonetti, 2012). Drawing on the stakeholder theory, organisational legitimacy is usually constructed and maintained through the use of a communicable brand image about the organisation to its stakeholders (Michelon & Parbonetti, 2012). (Michelon & Parbonetti, 2012) argue that companies usually employ outstanding directors in order to increase their social legitimacy. Further, directors usually use disclosure policies as a mechanism to legitimise the board operations as well as communicate trust to the stakeholders (Rodgers et al., 2013). The social contract theory implies that for an organisation to acquire social legitimacy, it must embrace the social values as well as demonstrate the value system that

is generally shared by the wider community (Michelon & Parbonetti, 2012). (Deegan & Blomquist, 2006) highlight that most firms rely on the disclosure of corporate governance information (social, environmental, risk management, going concern, directors background information etc.) to gain legitimacy. The AC's oversight and monitoring role provides directors with the conscience to manage organisational legitimacy (Beasley et al., 2009; Barka & Legendre, 2017). It is the responsibility of the AC to ensure that directors comply with all regulatory requirements, including corporate governance disclosure (Beasley et al., 2009; Barka & Legendre, 2017).

While the legitimacy theory might provide a useful insight into the relevance of CSD, directors have differing perceptions about the legitimacy theory and the usefulness of CSD. For example, some directors will adopt a particular legitimacy strategy that maximises their self-interest because of their parochial perception about their terms of the social contract. Further, there is a misconception about which particular group among the society of stakeholders has more influence than the others. How will managers determine which segment of society has the capacity and capability to confer the much needed legitimacy?

3.16.8 Corporate Sustainability disclosure reducing agency conflict

Financial capital gives rise to a wider range of complex formal and informal contractual relationships among equity owners, directors, creditors and the community (Armstrong et al., 2010). A greater demand for monitoring and bonding mechanisms is required in structuring these contractual arrangements in a way that helps reduce information asymmetry as well as alleviate agency conflicts (Jensen and Meckling, 1976). The formal contract involves structured written agreements such as job contracts, debt contracts and investment contracts. In contrast, the informal contract involves implicit multi-period

relationships that allow contracting parties to engage in a broad set of activities which cannot be captured by a formal contract (Armstrong et al., 2010). They argue that formal contracts are usually narrow in scope in comparison to informal contracts that address an array of wider stakeholder interests. An example of an informal contract is the social contract. The key driver of organisational sustainability is their ability to comply with their social obligations. Armstrong and Guay (2010) argue that organisations are a nexus of contracts (formal and informal); therefore, their sustainability hinges on their commitment to transparent financial reporting. Previous research has produced mixed results about the role of the AC in monitoring corporate governance (Gerety & Lehn, 1997; Krishnan, 2005; Beasley et al., 2009). For example, Gerety *et al.* (1997) find no relationship between ACs and fraud; further, Farber (2005) documented no relationship between ACs and earnings management. In contrast, Klein (2002) found a negative relationship between discretionary accruals and the proportion of outside directors on the AC, while Krishnan (2005) argues that the proportion of outside directors on the AC is negatively associated with incidence of internal control problems.

3.17 Audit committee and financial reporting quality

The Sarbanes-Oxley Act of 2002 (SOX) highlighted the importance of financial expertise on improving the quality of financial reporting process. Audit committees are responsible for providing oversight and monitoring of the financial reporting process in order to constrain opportunistic managerial reporting. This responsibility reflects the credo of the agency theory and the need to reduce managers' ability to extract rent from the firm (Cohen et al., 2013; Badolato et al., 2014b). Following Dechow (1995; 2010), to test for robustness of my results, I decided to test for the financial reporting quality of My data in order to further examine the effectiveness of the audit committee financial experts in constraining manipulation of earnings. The rationale behind the UK Corporate

Governance Code 2016 in relation to audit committee effectiveness is that by including

accounting financial experts on the board, the audit committee will be more effective in

preventing fraud and other financial malfeasance.

3.17.1 Earnings management – the modified Jones method

I measure financial reporting quality using non-discretionary accruals. Consistent with

the previous literature on earnings management, I computed non-discretionary accruals

by subtracting discretionary accruals from total accruals (Dechow et al., 1995; Klein,

2002).

I used the modified Jones method to test for the possibility of earnings management in

my sample as the modified Jones model provides some improvement in power to detect

the possibilities of earnings manipulations (Dechow et al., 2010). The modified Jones

version is designed to take into account unique industry and firm level factors that can

impinge upon the effectiveness of the model in detecting earnings manipulations

(Dechow et al., 1995).

Following Jones (1991) and Dechow (1995), total accruals are computed as:

$$TA_t = (\Delta CA_t - \Delta Cash_t + \Delta STD_t - \Delta Dep_t)/(A_{t-1}).$$

Where

ΔCA = changes in current assets (Bloomberg database)

ΔCA = changes in current liabilities

$\Delta Cash$ = changes in cash and cash equivalent

ΔSTD = changes in debt included in current liabilities

Dep = depreciation and amortization expenses

A = total assets

A_{t-1} = total assets at the end of $year_{t-1}$

Following Jones (1991), I calculated for non-discretionary accrual by controlling for the firms' economic circumstances on non-discretionary accruals.

Non-discretionary accruals in the event year are:

$NDA_t = \alpha_1(1/ A_{t-1}) + \alpha_2(\Delta REV_t/ A_{t-1}) + \alpha_3(PPE_t /A_{t-1})$ equation 1

Where:

NDA_t = nondiscretionary accruals in year t scaled by lagged total assets

ΔREV_t = revenue in year t less revenue in $year_{t-1}$

PPE_t = Gross property plant and equipment at the end of $year_t$

A_{t-1} = total assets at the end of $year_{t-1}$ and

$\alpha_1, \alpha_2, \alpha_3$ = firm-specific parameters

The firm-specific parameters α_1 , α_2, α_3 are estimated using the following model:

$TA_t/A_{t-1} = \alpha_1(1/ A_{t-1}) + \alpha_2(\Delta REV_t/ A_{t-1}) + \alpha_3(PPE_t /A_{t-1}) + \varepsilon_t$ equation 2

Where $_1$, α_2, and α_3 represent OLS estimates of α_1, α_2, and α^3; TA_t is total accruals in year t; ε_t is the residual that represents the firm-specific portion of total accruals. I obtained discretionary accruals by subtracting equation 1 from equation 2, thus:

Table 3.4 shows the regression results during the financial crisis period for total accruals and non-discretionary accruals using the modified Jones model.

Table 3. 4 Earnings management during period of GFC

	During Financial Crisis		
Source	**(SS)**	**(df)**	**MS**
Model	0.00026348	3	8.78E-06
Residual	0.000186834	166	1.13E-06
Total	0.000213182	169	1.26E-06

Number of observations	170
F Statistics	7.8
P Value	0.0001
R-Square	0.1236
Adjusted R-Squared	0.1078
Root Mean Square error	0.00106

TA_t / A_{t-1}	Coeffcient	Standard error	T-test	P-Value	Confidence level (95%)
$\alpha_1(1 / A_{t-1})$	0.1132959	0.0248384	4.56	0	0.0642
$\alpha_2(\Delta REV_t / A_{t-1})$	-0.0007843	0.0003939	2.99	0.0048	-0.0234
$\alpha_3(PPE_t / A_{t-1})$	-0.003368	0.0002207	2.83	0.0012	-0.0077
Constant	0.0000505	0.0001445	3.35	0.0072	0.00234

$$DA = TA_t/A_{t-1} = \alpha_1(1/ A_{t-1}) + \alpha_2(\Delta REV_t/ A_{t-1}) + \alpha_3(PPE_t /A_{t-1}) + \varepsilon_t - NDA_t = \alpha_1(1/ A_{t-1}) + \alpha_2(\Delta REV_t/ A_{t-1}) + \alpha_3(PPE_t /A_{t-1})$$

That is, the difference between the first regression of total accrual and the second regression of non-discretionary accrual equals discretionary accruals.

The results from table 3.4 show that the model is significant with ($\alpha_1 = 0.113$, $p = 0.000$; $\alpha_2 = 0.0007$, $p = 0.0048$; $\alpha_3 = 0.003$, $p = 0.0012$) and ($R^2 = 0.124$). To test for robustness I further calculated the summary statistic in percentiles for the distributions of discretionary accruals in my sample. The results for the percentiles summary statistics of discretionary accruals during the period of financial crisis are shown in Table 3.5

Table 3. 5 Earnings management results-summary statistics

Summary Statistics Discreationary Accruals- During Crisis				
Percentiles		**Smallest**		
1%	0.0030317	0.0041414		
5%	0.0007258	0.0030317		
10%	0.0004936	0.0014058		
25%	0.0001756	0.0013854	Observations	170
50%	Median	-0.0000143		
		Largest	**Mean**	1.21E-09
75%	0.0001149	0.0018533	std deviation	0.0010514
90%	0.0002598	0.0021062	Variance	1.11E-06
95%	0.000405	0.0034513	Skewness	6.58076
99%	0.0034513	0.11022	Kurtosis	74.64306

Table 3.5 shows the modified Jones model regression results during the post financial crisis period. I observed that the variance analysis from the regression results of total accruals were significant with a P-value close to 0 at the 95% confidence level. The sum of squares of variables within my model and the sum of square of the residuals is 0.000026 and 0.00019, respectively, giving us a total sum of squares of 0.0002. I have four variables in my model with a total observation of 170, therefore my degree of freedom within my model *(k-1)* and across my total observation *[K (n-1)* is 3 and 169, respectively. my mean square measures the average of the square of the deviation of the mean estimator from the actual mean. I calculated this by dividing the sum of squares by the degree of freedom.

My null hypothesis is H0: $= \mu_a = \mu_b = \mu_c$ and my alternative hypothesis is at least one inequality between the mean Ha: $= \mu_a = \mu_b \neq \mu_c$. Therefore, holding my entire regression assumptions constant (normal distribution, no or little multicollinearity, no auto correlation, homoscedasticity). The P-value of My F-statistic is very significant at both the 95% and 99% confidence levels. My P-value is essentially 0, which is less than α (0.1, 0.05 and 0.01). This implies that my model is statistically significant at both the 95% and 99% confidence levels. Further, my F-statistic value of 7.8 is bigger than the F-critical

value of 3. I am therefore 99% confident in rejecting my null hypothesis. Further, my R-square, which is the coefficient of determination, is significant. The R-square of 0.124 implies that 12.4% of the variations in discretionary accruals can be explained by my model. Further, the P-values of my T-test are significant. This implies that each of the four variables in my model is significant. The results from the T-test further confirm that I can reject the null hypothesis

To test for earnings quality, I subtracted non-discretionary accruals from total accruals to obtain discretionary accruals. The results from the discretionary accruals show that at the 99% confidence level the discretionary accruals is almost 0 at 0.0010 with a mean value close to 0. This implies that out test failed to reveal any possibility of earnings management. The result is consistent with previous studies that posit that there is a negative association between accounting finance experts and earnings management (Klein, 2002).

Table 3.6 shows the regression results for post financial crisis period for total accruals and non-discretionary accruals using the modified Jones model.

The results from Table 3.4 show that my model is significant ($\alpha_1 = 0.108$, $p = 0.000$; $\alpha_2 = 0.004$, $p = 0.0052$; $\alpha_3 = -0.00008$, $p = 0.0046$) and ($R^2 = 0.249$). To test for robustness, I further calculated the summary statistic in percentiles for the distributions of discretionary accruals in my sample. The results for the percentiles summary statistics of discretionary accruals during the period of financial crisis are shown in Table 3.6

Table 3. 6 Earnings management Regression results -Post GFC

	Post Financial Crisis				
Source	**(SS)**	**(df)**	**MS**	**F-Statistics**	**F-Critical**
Model	0.000440045	3	1.47E+05	18.87	3.0000
Residual	0.0158302	2037	7.77E-06		
Total	0.016270262	2040	7.98E-06		

Number of observations	2041
F Statistics	18.87
P Value	0
R-Square	0.2497
Adjusted R-Squared	0.2256
Root Mean Square error	0.00279

TA_t/A_{t-1}	Coeffcient	Standard error	T-test	P-Value	Confidence level (95%)
$\alpha_1(1/A_{t-1})$	0.1076727	0.0146636	7.34	0.0000	0.0789
$\alpha_2(\Delta REV_t/A_{t-1})$	0.004126	0.0002698	3.99	0.0052	-0.2334
$\alpha_3(PPE_t/A_{t-1})$	-0.0000826	0.0001449	2.73	0.0046	-0.2677
Constant	0.0000203	0.0000882	2.45	0.0562	0.03236

Table 3. 7 Earnings management summary statistics-Post GFC

Summary Statistics-Discreationary Accruals-Post Financial crisis				
Percentiles		Smallest		
1%	0.0016383	0.0238933		
5%	0.0004312	0.0213439		
10%	0.0002149	0.0193259		
25%	0.0000665	0.130256	Observations	2041
50%	Median	-3.15E-06		
		Largest	Mean	0.0000631
75%	0.0000712	0.00888	std deviation	0.000279
90%	0.000206	0.0103921	Variance	7.80E-06
95%	0.0005211	0.0425225	Skewness	27.06271
99%	0.0027533	0.1050774	Kurtosis	27.06271

The variance analysis from my regression results of total accruals was significant with a

P-value close to 0 at the 95% confidence level. The sum of squares of variables within

my model and the sum of squares of the residuals is 0.0158302 and the total sum of

squares is 0.016270262. I have four variables in my model with a total observation of

2040. The degree of freedom within my model is *(k-1) = 3* and across my total observations *[K (n-1)* = 2037. My mean squares measure the average of the squares of the deviation of the mean estimator from the actual mean. I calculated this by dividing the sum of squares by the degree of freedom.

My null hypothesis is H0: $= \mu_a = \mu_b = \mu_c$ and my alternative hypothesis is at least one inequality between the mean Ha: $= \mu_a = \mu_b \neq \mu_c$. From My regression results, the P-value of My F-statistic is very significant at both the 95% and 99% confidence levels. The P-value is very close to 0, which is less than α (0.1, 0.05 and 0.01). This implies that my model is statistically significant at both the 95% and 99% confidence levels. Further, the F-statistic value of 18.87 is bigger than the F-critical value of 3. The results of the residual (0.000186834) show that my test revealed virtually no discretionary accruals. I am therefore 99% confident in rejecting my null hypothesis. Further, the R-square, which is the coefficient of determination, is significant. My R-square of 0.2256 implies that 22.6% of the variations in discretionary accruals can be explained by my model. Further, the P-values of the T-test are significant. This implies that each of the four variables in my model is significant. The results from the T-test further confirm that I can reject the null hypothesis.

To test for earnings quality, I subtracted non-discretionary accruals from total accruals to obtain discretionary accruals. The results from discretionary accruals shows that at the 99% confidence level the discretionary accruals are almost 0 at 0.0010 with a mean value close to 0. This implies that out test failed to reveal any possibility of earnings management. The result confirms my hypothesis 7 that states that there is a positive association between accounting finance experts and earnings quality.

These results may be due to the fact that the UK has strong financial regulatory and corporate governance systems. Further, all FTSE 350 companies in the UK must have at least one accounting finance expert serving on the audit committee.

In comparison to my results from the period of the financial crisis, I observed that post financial crisis results show that at the 99% confidence level my sample size shows about 10% earnings management, compared to 0.03% during the period of financial crisis. This implies the financial reporting quality was better during the period of financial crisis in comparison to the post financial crisis period.

The major limitation of the modified Jones model is that mangers may engage in complex off-balance sheet transactions to manage earnings rather than relying on choice of accounting policies. Several of these off-balance sheet transactions may not be detected by the modified Jones model. Further, the model does not account for the unforeseen bad financial performance of companies. In a period of economic instability, managers do not have to rely on accounting choices to manage earnings. Further, mangers may rely on cost allocation rather than revenue to manage earnings. Managers can use cost allocation to shift revenues and expenses between different types of investment activities. Finally, the power of the modified Jones test may not be strong enough to detect mangers' income decreasing accounting choices.

I test my data for earnings management before running my regressions as part of my robustness to ensure that the AC effect on financial health and firm value is not biased.

3.18 A systematic literature review on financial reporting quality

To confirm the earnings management regression results in Tables 3.5 and 3.6, I conducted a systematic review of the AC and financial reporting quality literature using previous studies on earnings management from 2002 to 2017 to provide transparency, clarity and focus to my study (Thorpe et al., 2005). Following Thorpe *et al.* (2005), I conducted a

systematic literature review by going through three stages: First, I conducted a database search, which involves searching through three main databases (Google Scholar, Web of Science and EBSCO). Second, I applied exclusion criteria using the advance search criteria to narrow down my search findings to key peer reviewed 3-4* (ABS) articles on earnings management. Third, I used citation analysis to identify the top 25 most cited articles (experts) on earnings management. Figure 3. Below shows the three stages of my systematic literature review. First I searched database including web of science, EBSCO, google scholar applying Boolean search techniques to identify key literature on AC attributes and corporate financial performance and firm value. Second I apply different exclusion criteria to arrive at peered reviewed articles that focused on my field of study. Third I used citation analysis to identify expert's articles in my field studies. In table 3.8, I provide the views of experts in my field of studies from 2002 to 2017 in order to identify possible gaps in the literature. I observed that my study is the first that simultaneously used PLS-SEM to examine AC effectiveness in UK during periods of uncertainties and stable periods.
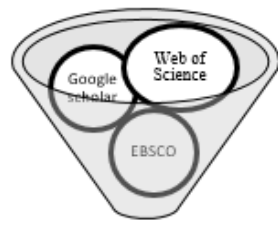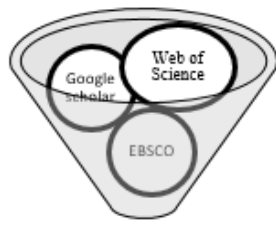
Stage 1: searching the database:
We used phrases including earnings management, earnings quality, financial reporting quality, discretionary accruals" Audit committee and earnings management, synonyms; discretionary accruals, discretionary accruals, abnormal accruals etc. to search the data base: Advance search criteria -peer review articles Number of searches found (699,976)

Boolean searches

Stage 2: Exclusion analysis
We used the advance search criteria- Subject: accounting, finance and management, Articles: peer review, phrase; "audit committee and earnings management", "audit committee and financial reporting quality", "audit committee accruals quality", etc. Exclusion criteria, year = 2002-2017, Peer reviewed articles in 3 – 4* ABS. Number of searches found (348)

Boolean searches

Stage 3 Citation analysis
Using citation analysis we narrowed our search results by focusing on the top 25 most cited articles about audit committee effectiveness on financial reporting quality Number of searches found (25)

Boolean searches

Figure 3. 13 Systematic literature review chart

Table 3. 8 Conflict in the AC literature - SLR from 2002-2017

Author(s)	Sample	Dependent Variable	Independent variables	Results
Klein (2002a)	692 US S&P 500 Index firm from periods between 1992 and 1993.	Earnings management measured by absolute values of abnormal accruals calculated from a cross sectional version of the Jones (1991) model.	AC independence, CEO shares, Blockholder AC	There is a negative association between AC independence and abnormal accruals. Further, there is a negative association between board independence and abnormal accruals (Klein, 2002).
Felo, Krishnamurthy et al 2003	246 Firms from the 1992-96 Association for Investment Management and Research (AIMR) financial reporting quality database.	Financial reporting quality measured by analysts and reported in the 1992-93 and 1995-96 AIMR Review of Corporate Reporting Practices (AIMR 1994, 1997).	AC finance expert, AC size, Independence board, AC meetings, institutional ownership, market value of equity,	There is positive association between AC size and financial reporting quality. However, there is no association between AC independence and financial reporting quality (Felo et al., 2003)
Xie, Davidson and DaDalt (2003a)	282 firm-years from the US S&P 500 Index from periods between 1992- 1996.	Discretionary accruals measured by a cross sectional version of the Jones (1991) model adjusted by Teoh, Welch and Wong (1998a).	AC finance experts, CEO duality, board meetings, AC meetings, AC independence, block holder CEO, board size and percentage inside directors.	AC with finance experience is negatively associated with discretionary accruals. Further, AC meetings is negatively associated with discretionary accruals (Xie et al., 2003).

Author(s)	Sample	Dependent Variable	Independent variables	Results
Choi, Jeon and Park (2004)	116 firm-years from the Korean Stock Exchange from periods between 2000 and 2001.	Discretionary accruals measured by cross sectional version of the Jones (1991) model.	AC independence, AC finance experts, AC meetings, AC size and various control variables.	Positive association between meetings AC and earnings management. Further, The AC with experience finance experts was negatively associated with earnings management (Choi et al., 2004).
Bedard et al 2004	3451 firm year's observations from Compustat database. Period 1996	Abnormal accruals calculated from the cross sectional version of the modified Jones (1991) model (DeFond and Jiambalvo 1994; Becker et al. 1998).	ACFE, NACFE, AC independence, AC meetings, ROA, Leverage, stock options	AC finance experts with independence has negative association with aggressive earnings management (Bedard et al., 2004).
Van der Zahn and Tower (2004)	485 firm-years from the Singapore Stock Exchange in 2000 and 2001.	Discretionary accruals calculated from a cross sectional version of the Jones (1991) model.	Audit committee independence, audit committee expertise, number of audit committee meetings and various control variables.	Firms with a higher proportion of independent audit committee members were more effective at reducing earnings management. There was no significant association between the magnitude of earnings management and the level of an audit committee' financial expertise amongst its

Author(s)	Sample	Dependent Variable	Independent variables	Results
Abdullah and Nasir 2004	All non-financial firms listed in the Kuala Lumpur Stock Exchange (KLSE) in 1997.	Accrual management was measured as the abnormal (discretionary) working capital accruals (i.e. DACC) consistent with DeFond and Jiambalvo (1994).	Board independence, AC independence, CEO dominant personality, gearing ratio, tightness of shareholding,	AC independence and board independence have negative association with earnings management. Further, the interactive effects of board independence and audit committee independence have insignificant association with earning management (Abdullah & Nasir, 2004)
Defond et al 2005	Corporate library database for 1,700 U.S. corporations and more than 21,000 individual directorships for the 2002- 2003 proxy reporting year	Firm performance measured by ROA, Leverage, Market to book ratio.	Board size, Board independence, ACFE, NACFE, Institutional ownership, Governance, AC independence, AC education, AC experience	There is positive association between ACFE appointment to AC and market value but no association between NACFE appointment and market value (DeFond et al., 2005)
Yang and Krishnan (2005)	896 firm year observations from the US Compustat database between 1996-2000	Total discretionary accruals calculated from the cross-sectional Jones (1991) model; and calculation of the current discretionary accruals based on Teoh, Wong and Rao (1998b).	AC independence, AC meetings, ACFE, stock ownership, number of outside directors, AC tenure	No significant association between either ACFE, NACFE and discretionary accruals audit committee directors was negatively associated with quarterly earnings management

Author(s)	Sample	Dependent Variable	Independent variables	Results
Dhaliwal, Naiker & Navissi (2006)	1,114 firm years from the US Compustat database between 1995 and 1998.	Accruals quality derived from a modified version of the Dechow and Dichev (2002) model as suggested by McNichols (2002).	Governance score, AC size, AC meetings, Board independence, CEO-Chair duality, share ownership	There were significant positive association between ACFE and earnings quality. No significant relationship between NACFE and earnings quality
Lin, Li et al (2006)	267 US companies data collected from Compustat database	Absolute value of total accrual that is net income minus cash flow from operating activities deflated by operating total assets Dechow et al 1995)	Size of AC, financial experts, stock ownership, AC independence, AC meetings, leverage ratio, market to book ratio	There is a negative association between the size of AC and earnings management. However, no significant association was found between the other AC characteristics and earnings management (Lin et al., 2006)
Piot C. et al (2007)	102 non-financial firms from the SBF 120 index company on the French stock market. Data collected from Diane database between 1998-2002)	Accrual quality calculated from a modified version of the Dechow and Dichev (2002).	Big 5, audit turnover, Ln total assets, Board size, leverage, independent directors, audit committee	The presence of the AC but not AC independence curb earnings management. Further, the presence of the big 5 make no difference to earnings management (Piot & Janin, 2007)

Author(s)	Sample	Dependent Variable	Independent variables	Results
Krishnan et al (2008)	Data from S&P 500 including 929 firm years observation (633 for the conservative score measure) representing years 2000 through 2002.	Measure accruals using accounting Conservatism i. e Book-to-market ratio (BTM) on current and six lagged (k = 0-6) annual stock returns (RET) (Beaver and Ryan 2000),	ACFE, NACFE, Board size, CEO dualism, debt ratio, AC meetings,, profitability ratio, inventory, R&D,	ACFE and NACFE are not correlated with accounting conservatism. However, ACFE is positively and significantly correlated with book to market ratio (Krishnan & Visvanathan, 2008)
Beasley et al (2009)	Data obtained through in-depth interviews of 42 individuals actively serving on U.S. public company audit committees.	Effectiveness of AC oversight process (conceptual research)	Structured interview on external auditors, fraud risk, management integrity, whistle blowers, AC meetings	AC strive to provide effective monitoring, however most of their actions are ceremonial. Most AC members do not perceive fraud risk as significant issue (Beasley et al., 2009)
Mustafa et al (2010)	Data consist of 28 publicly held companies in the USA experiencing assets misappropriation of from 1987 to 1998, as well as 28 control companies matched according to size, industry, and time period.	Assets misappropriations is measured by the natural logarithm of asset growth, current asset ratio, asset turnover, and company size	AC meetings, AC size, ACFE. NACFE, AC turnover, assets turnover, AC independence	There is a negative association between ACFE and assets misappropriations. Further, independence of AC can improve reduction of assets misappropriation (Mustafa & Ben Youssef, 2010)

Author(s)	Sample	Dependent Variable	Independent variables	Results
Dhaliwal (2010)	Data from Compustat and board analytics database including 770 firms during a post-SOX period between 2004–2006.	Accruals quality derived from a modified version of the Dechow and Dichev (2002) model as suggested by McNichols (2002).	Board independence, share ownership, AC tenure, ACFE, NACFE	AC expertise is positively associated with accrual quality. Further, The most positive impact on accruals quality is achieved when firms possess a combination of a mixture of ACFE, NACFE and Supervisory experts (Dhaliwal et al., 2010)
Dhaliwal et al 2010	770 firms with available data during a post-SOX period (2004–2006), Data collected from Compustat and board analytics database	Accrual quality calculated based on Dechow and Dichev (2002) model.	ACFE, NACFE, AC independence, AC meetings, Supervisory experts, CEO duality, AC size, AC tenure	ACFE who owes share, have low tenure and have multiple directorship has positive associated with accruals quality. Further the most significant positive association between AC and accrual quality is achieved when firms combined ACFE and NACFE on the board (Dhaliwal et al., 2010).
Aldamen et al 2012	120 firms in the S&P 300 during the global financial crisis period between 2008-2009	Performance is measured by percentage price change and ROA (Ozkan 2004)	Number of meeting, Grey directors, independent directors, AC chair, AC chair experience, ROA ACFE, NACFE, CEO, AC education, Nook value of total assets	Smaller size audit committees with more experience financial experts are more likely to be associated with positive firm performance in the market. Further longer serving AC chair is negatively associated with poor performance (Aldamen et al., 2012).

Author(s)	Sample	Dependent Variable	Independent variables	Results
Hamdan et al 2013	Data from Amman Stock Exchange Market with a total of 212 observations from 2008-2009	Stock performance measured by EPS and financial performance measured by ROA	AC size, AC meetings AC experience, Net profit margin, Leverage, market value added, Company size	Positive association between audit committee and firm performance only with the firms in the non-financial sector of the Amman stock exchange (Hamdan et al., 2013).
Bruynseels et al 2013	Compustat database, 18,214 firm-years for which social ties data were available from BoardEx on January 2010 for the fiscal years 2004–2008	Discretionary accruals measured by absolute values of abnormal accruals calculated from a cross sectional version of the Jones (1991) model.	**Social ties** were measured by education, employment, other ties, CEO chair, board size, CEO tenure, market to book ratio, Long term debt divided by total assets,	Although several audit committees appear to be "independent", anecdotal evidence shows that CEOs often appoint directors from their social networks. The social ties have a negative effect on variables that proxy for AC oversight quality (Bruynseels & Cardinaels, 2013).
Badolato, et al 2014	Biographical data of corporate directors from BoardEx database covering the years from 2001-2008	Earnings irregularities measured by abnormal accruals using the modified-Jones model with an intercept	Supervisory expert, NACFE, ACFE, AC size, Board independence, CEO, Leverage, institutional ownership, ROA	The Sox act of 2002 requirement to increase the number of independence directors (SEC 2003a) led to the decline of AC status as the definition of AC allows NACFE who are less experienced to be appointed to the board. Thus the decline in status limit AC ability to curb opportunistic behaviour (Badolato et al., 2014a)

Author(s)	Sample	Dependent Variable	Independent variables	Results
Chen et al 2015	1587 US firms with board data from BoardEx for the period 2000–2005. Sample stratified into 55% before Sox 2002 compliant firms and 45% non- compliant firm post Sox 2002	Discretionary accrual measured using the modified Jones model consistent with prior studies (e.g., Kothari et al. 2005; Yu 2008; Cohen et al. 2008).	AC independence, market to book value, ROA, Leverage, percentage share ownership, non-compliance, information access score (IS)	Firm that do not have majority NED but have low information cost post Sox 2002 have significant reduction in Earnings management. Further, AC independence only have significant inverse association with earnings management when there is full corporate governance disclosure (Chen et al., 2015)
Kusnadi 2016	423 non-financial firms listed in Singapore Exchange data includes fiscal year 2010 from the COMPUSTAT Global database.	Financial reporting quality is the standard deviation of residuals from cross-sectional regressions of on Dechow and Dichev (2002), multiplying by -1.	AC independence, AC size, Board size, AC meetings, ACFE, NACFE, Supervisory experts, all experts, CEO duality	Incremental independence on audit committee does not enhance financial reporting quality because majority of AC are independent. Further Financial reporting quality increase when AC comprise of diverse finance experts including ACFE, NACFE and supervisory experts (Kusnadi et al., 2016).
He, Pittman et al. 2017	6998 firm-year observations between 2004 and 2010 in CSMAR China Stock Market and Accounting Research Data Base (CSMAR).	Tobin's Q is market value of common equity plus the book value of debt divided by total assets at the end of the year	AC chair, AC members school ties, ACFE, NACFE, Earning restatement, ROA, Leverage, inventory, receivables	School ties between engagement auditors and AC impair audit quality. Further, there is high audit fees in the presence of social ties between an engagement auditor and the AC (He et al., 2017)

Author(s)	Sample	Dependent Variable	Independent variables	Results
Setiany et al 2017	100 companies listed in Kompas 100 index in the Indonesian Stock Exchange within the years of 2009 and 2012.	Financial reporting quality measured by the level of financial disclosure	AC Size, Education background of AC, AC independence AC meetings, AC tenure,	There is a positive association between voluntary financial disclosure (transparency) and AC size, AC independence and AC average tenure. However, there is insignificant association between Financial statement disclosure (transparency) and AC education background and AC meetings (Setiany et al., 2017)
Barka et al 2017	250 companies listed on Société des Bourses Françaises index (SBF 250) between 2002-2006	Firm performance measured by ROA and ROE	Board size, board meeting, firm age, CEO tenure, AC independence, board independence, total assets	There is a negative association between AC independence, AC meetings and firm performance (Barka & Legendre, 2017)
Gurusamy 2017	357 manufacturing firms listed in Bombay stock Exchange BSE during the period 2006-2015.	Firm performance measured by Tobin's Q, ROE and ROE	Board size, CEO duality, Board independence, AC size, Board meeting, institutional shareholding, gearing ratio, AC independence	Board size is positively and significantly associated to Firm performance measured by ROA and ROE. However Board size has negative association with firm performance (FP) when PF is measured by Tobin's Q. Further Audit committee has a significant negative association with ROE(Gurusamy, 2017).

3.19 Effects of AC on corporate financial performance – during the GFC

Stakeholder expectations in confining the fraudulent behaviour of corporate managers following the global financial scandal is predicated upon the audit committee (Ionescu, 2014). The audit committee plays a key role in risk management and the financial decision making process of most firms (Aldamen et al., 2012). Aldamen *et al.* (2012) argue that during periods of economic turbulence, the quality of the firm's risk management and financial decision making process mitigates the adverse effects of exogenous economic shocks. Adopting effective corporate governance practices, such as enhancing AC effectiveness during periods of adverse economic uncertainties, can improve monitoring of management (Aldamen et al., 2012; Bentley et al., 2013; Badolato et al., 2014a) and transparency (Carcello et al., 2002) and improve investors' trust in the organisation (Holm & Zaman, 2012). The extant corporate governance literature provides a mixture of arguments that link AC effectiveness to firm value during the period of the global financial crisis (GFC). The fundamental argument in most corporate governance literature is that a higher level of independence and financial expertise on AC is associated with better firm performance during a period of economic uncertainty (Aldamen et al., 2012; Bentley et al., 2013; Badolato et al., 2014a). Aldamen *et al.* (2013) posit that governance impact on AC during the period of the GFC resulted in greater monitoring and transparency, improved risk assessments, and improved financial decision, which in turn impacted positively on firm value. Further, they argue that due to the financial nature of the GFC, it is the AC governance attribute that matters most. Their core arguments is that during periods of economic uncertainty, the AC contributes towards the financial reporting quality, monitoring of financial data, risk evaluation and financial disclosure. On the negative side, some scholars argue that if AC is associated with positive firm

performance, then why they had a lesser presence in global financial scandals such as Enron and Lehman Brothers.

One of the mysteries of Enron case is how an audit committee with a high level of financial expertise was unable to detect such a massive fraud. Some scholars argue that the AC may not be able to function effectively because their initiatives and efforts may be side-lined by the board of directors (Ionescu, 2014) and organisational politics while the communication process may not support their operations (Turley & Zaman, 2007); also, the AC may be composed of cronies of the chief executive (Bruynseels & Cardinaels, 2013).

Turley *et al.* (2007) argue that the analysis of AC effectiveness should consider the behavioural dynamics of the AC in the organisation. These include:

Formal processes – These are the rules, requirements and procedures established by the organisation that governs the operations of the AC. The formal procedure includes size of membership, frequency of meetings, meeting procedures, and the qualifications and expertise levels of members. They argue that these organisational structures can impact negatively on an AC's operations, especially during a period of economic crisis when AC initiatives may be stifled due to compliance with rules and regulations. The formal process can be linked to rule-based trust, which relies on well-established organisational norms and traditions during the financial decision making process

Informal process – The individual behavioural traits of the AC members can lead to conflicting values and interests. Turley *et al.* (2007) argue that the interactions between the individual AC members may result in the establishment of processes outside the formal structures set up by the organisation. These informal structures play a prominent role in shaping the type of information collected and the decision making process of the

AC. The informal process can be linked to third party-based trust, which relies on reliable network information during the financial decision making process

Power relationship – The AC plays an integral role in the governance process of the organisation. Most organisational "governance culture" is dominated by the political power process (Turley & Zaman, 2007). The AC is likely to affect or be affected by the power structure within the organisation. It is the power holders who can affect firm performance during a period of crisis, not the AC. This is evident in most high level corporate scandals that took place across the world. The power relations can be linked to the rationale based trust in which those who have power make decisions without taking into account the availability of relevant information. Figure 3.14 shows the structures influencing AC effectiveness.
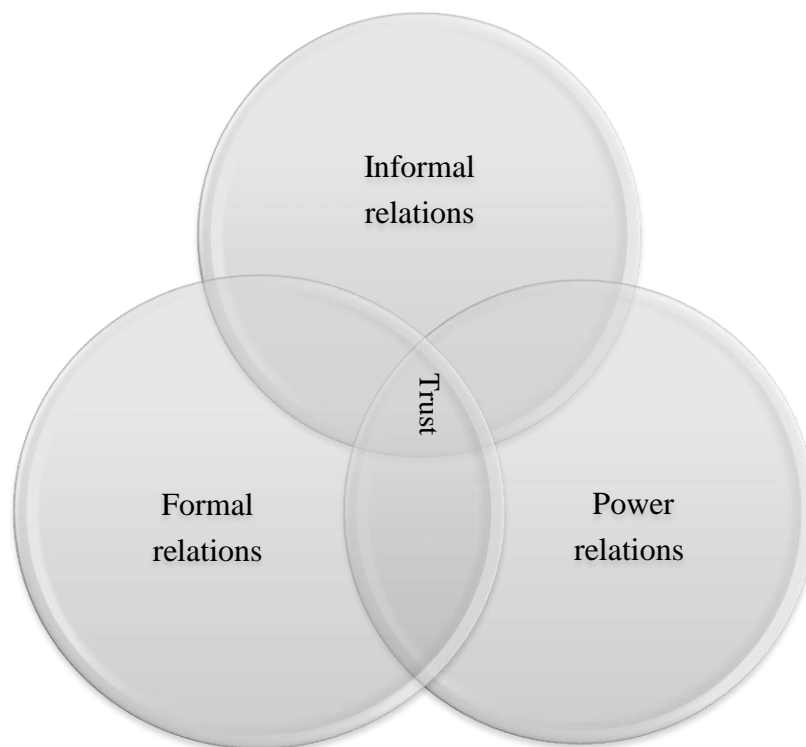
Figure 3. 14 Structures influencing AC effectiveness

As mentioned in my previous chapter, trust plays an integral role in all relationships types. To be effective, AC needs to operate in an atmosphere of trust. Therefore, I examined AC effects on corporate financial performance and value using the AC trust decision making framework that integrate the six decision making pathways in a throughput model. Figure 3.15 below shows the Audit Committee decision making pathways framework (ACDMPF) for the study.
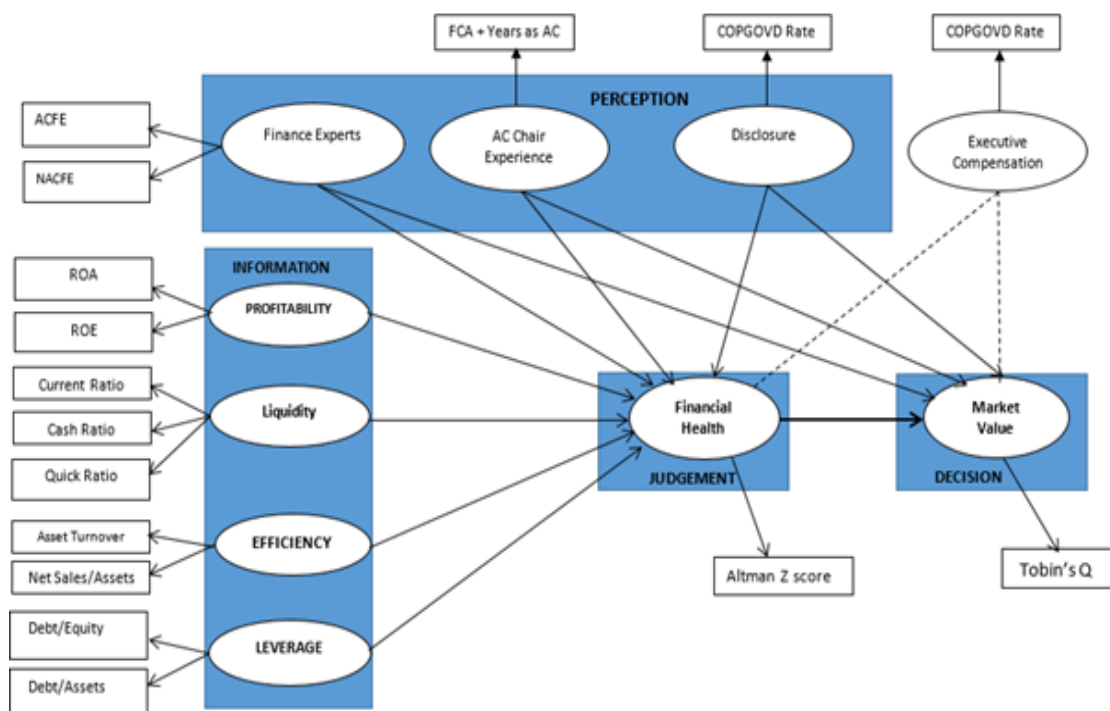
Figure 3. 15 Audit Committee decision making pathways framework (ACDMPF)

Following Rodgers (2013), I used the throughput model (TPM) as theoretical foundation of my model. The throughput decision making pathways (TPDMP) illustrate the decision making positions that can be adopted by the audit committee in performing their monitoring and oversight roles. In the theoretical framework used in figure 3.15, AC perception is influenced by factors including education (level of financial expertise), AC chair experience, corporate sustainability disclosure and executive compensation. Further, in performing their oversight and monitoring responsibilities, AC rely on accounting **Information** (example profitability ratios, liquidity ratios, leverage,

efficiency ratios etc.) as guide to make judgement about the integrity of the financial reporting process. Available accounting information determines the financial health of the firm which I represent as **judgement**. I argue that, the financial health of a firm influences investors perception and hence judgement and **decision** about investing in a firm. On the other hand, AC **perception** about accounting **information** influences their **judgment** about the financial health of a firm. In this study, I use Altman z-score to measure financial health of a firm and Tobin's Q (market value of a firm divided by the book value) to measure decision because Tobin's q reflect TMT reflects TMT's decision and investors decision at the same time. Thus figure 3.15 further explore the dominant decision making pathways that can be used by audit committee to influence firm's outcomes. However, as a result of non-availability of data this study only focused on three main audit committee decision making pathways which includes; the rational pathways of P→D, the rule based decision making pathway of P→J→D and category-based decision making pathway of I→J→D.

3.20 AC decision dominant decision making pathways and firms outcomes

As discussed in the previous chapter, there are six dominant positions that can be used by the decision maker during the decision making process. In this chapter I examine three dominant positions that are mostly used by AC and their effect on firm outcomes. For the purpose of illustration, I called P → D the expert pathway because experts are able to make quick decision with little or no information (Waymond, 2007; Rodgers, 2010b; Rodgers et al., 2013). I called P→J→D Rules informed decision pathways because in that pathway, AC's rely on rules, procedures, legislations etc. in making decisions. In I→J→D pathway AC mainly rely on third party so I called that third party informed pathway.

3.20.1 Expert pathway

(a) **P → D Expert pathway**; in this pathway it is assumed that the AC comprises experts in their field who, as a result, are able to make decisions with little or no information.

3.20.2 Rules informed pathway

(b) **P → J → D Rules informed pathway**; in this pathway strictly enforceable rules (IFRS, IAS, ISA etc.) and legal systems influence the AC's perception and judgements during decision making. Critics of this position argue that AC's who adopt the rule informed position mostly engage in 'box-ticking exercise' to avoid blames (Rodgers, 2010a)

3.20.3 Third party informed pathway

(c) **I → J → D Third party informed pathway**; in this pathway AC judgment is influenced by both third party information and accounting information. For example AC may require third party (external agencies) to confirm certain events or transactions that took place in the firm.

In Table 3.9 and 3.10, I provide summary statistics and variables descriptions for my study respectively.

Table 3. 9 Summary statistics

Indicator	Summary Statistics –During period of economic crisis							Summary Statistics – Post period of economic crisis						
	Mean	Std. Deviation	Minimum	Maximum	Percentiles 25%	Percentiles 50%	Percentiles 75%	Mean	Std. Deviation	Minimum	Maximum	Percentiles 25%	Percentiles 50%	Percentiles 75%
Tobin's Q	1.555	0.975	0.467	12.104	1.005	1.232	1.753	1.930	2.949	0.453	80.938	1.061	1.430	2.094
Z-Score	4.692	10.185	-2.953	5.728	2.031	2.994	4.768	5.169	9.884	-2.953	5.832	2.250	3.530	5.579
Firm Age	26.875	16.130	4.000	52.000	13.000	23.000	45.000	26.875	16.130	4.000	52.000	13.000	23.000	45.000
Board Size	9.623	2.777	5.000	21.000	8.000	9.000	11.000	9.457	2.532	4.000	21.000	8.000	9.000	11.000
Accounting Finance Expert	0.736	0.671	0.000	1.000	1.000	1.000	1.000	0.736	0.671	0.000	1.000	1.000	1.000	1.000
Non Accounting Finance Expert	0.882	0.737	0.000	1.000	0.000	1.000	1.000	0.897	0.743	0.000	1.000	0.000	1.000	1.000
MBA	0.520	0.680	0.000	1.000	0.000	0.000	1.000	0.643	0.752	0.000	1.000	0.000	0.000	1.000
Chair Experience	0.671	0.112	0.000	1.000	0.225	0.416	0.592	0.921	0.132	0.000	1.000	0.295	0.516	0.792
Sustainability Disclosure	0.115	0.168	0.016	0.125	0.036	0.094	0.158	0.254	0.485	0.111	0.947	0.035	0.082	0.142
ROA	0.042	0.122	-0.739	0.615	0.003	0.043	0.088	0.059	0.123	-0.439	2.355	0.005	0.046	0.092
ROE	0.143	0.356	-0.539	0.468	0.027	0.131	0.240	0.179	0.723	-0.136	0.615	0.012	0.124	0.219
Current ratio	1.828	3.470	0.118	49.143	0.881	1.278	1.705	1.879	3.414	0.030	61.978	0.888	1.292	1.804
Cash ratio	0.758	3.281	0.001	47.571	0.135	0.253	0.489	0.783	3.263	0.001	53.476	0.143	0.282	0.543
Efficiency ratio	0.860	0.720	0.433	4.101	0.325	0.730	1.200	0.772	0.731	0.000	4.630	0.210	0.620	1.111
Debt to equity	1.526	0.394	0.086	0.398	0.046	0.286	0.379	1.076	0.397	0.076	0.398	0.046	0.276	0.379
Debt to assets	0.246	0.199	0.000	0.995	0.029	0.192	0.322	0.216	0.199	0.000	0.995	0.029	0.192	0.322
Executive Compensation (Ln)	13.578	0.728	11.780	18.842	13.130	13.500	13.937	13.727	0.646	9.793	19.532	13.322	13.693	14.109

Notes: This tables reports the summary statistics for the periods during economic crisis and post economic crisis. Further, we measure Executive compensation by natural logarithm of the total executive compensation for the period. We included MBA in our descriptive statistics because most of the non-accounting financial experts in our sample had MBA qualification. The definitions of variables included in our sample can be identified on table (4)

Table 3. 10 Variable definition

Table 1. Definitions of the variables	
Indicators and constructs	**Definition**
Tobin's Q	The ratio of the market value of firm to the replacement value of the firm's assets. (Source: Bloomberg)
Z-Score	Proxy for financial health. Altman's (1968) Z-score is calculated as follows: [Z= 3.3*(EBIT/Tangible assets) +0.6*(Market value of equity/total liabilities) +1*(Sales/tangible assets) +1.2*(Working capital/tangible assets) +1.4*(retained earnings/tangible assets)]. (Source: Bloomberg)
Board Size	Logarithm of the total number of directors (Source: Bloomberg)
Firm age	The number of years since the inception of the firm as of the corresponding year in the panel. (Source: Bloomberg)
Independent Directors	Percentage of independent directors over total number of directors on the board (Source Bloomberg data)
Accounting Finance Expert[1]	Dummy variable: 1, if audit committee includes at least 1 independent qualified accountant (example ACCA, CPA, CIMA, CFA, ICAEW etc. 0, otherwise. (Source: authors' own construction)
Non Accounting Finance Expert	Dummy variable 1 if the AC includes at least one finance (supervisory) expert in each year during the sample period, and 0 otherwise. (DHALIWAL, 2010)
Executive Compensation	Logarithm of sum of salaries, wages and bonus paid to directors (Source: Bloomberg)
MBA	Dummy variable: 1, if AC member has MBA qualification otherwise 0
AC Chair Experience	Dummy variable: 1, if AC chair is an experienced accounting certified financial expert (for example, FCA, FCPA, Partner etc.) otherwise 0
Sustainability Disclosure (CSD)	A score based on the extent of company's Growth, Environment, Social and Governance disclosure (Source Bloomberg)
Return on assets	ROA. Net income over total assets. (Source: Bloomberg)
Return on equity	ROE. Net income over equity capital. (Source: Bloomberg)
Profitability	Proxy for corporate profitability as a latent construct, which is the linear combination of ROA and ROE.
Current ratio	The ratio of current assets to current liabilities. (Source: Bloomberg)
Cash ratio	The ratio of cash and near cash items plus marketable securities & other short term investments to current liabilities. (Source: Bloomberg)
Quick ratio	The ratio of current assets less inventories to current liabilities. (Source: Bloomberg)
Liquidity	Proxy for corporate liquidity as a latent construct, which is the linear combination of *Current ratio*, *Cash ratio* and *Quick ratio*.
Debt to equity	The ratio of total debt to total book value of equity. (Source: Bloomberg)
Debt to assets	The ratio of total debt to total assets. (Source: Bloomberg)
Leverage	Proxy for corporate indebtedness as a latent construct, which is the linear combination of *Debt to equity* and *Debt to assets*.
Assets turnover	Total sales revenues divided by total assets. (Source: Bloomberg)
Sales to assets	Total sales revenues divided by net assets. (Source: Bloomberg)
Efficiency	Proxy for efficiency of corporate operations as a latent construct, which is the linear combination of *Assets turnover* and *Sales to assets*.
Tobin's Q	The ratio of the market value of firm to the replacement value of the firm's assets. (Source: Bloomberg)
Z-score	Proxy for financial health. Altman's (1968) Z-score is calculated as follows: [Z= 3.3*(EBIT/Tangible assets) +0.6*(Market value of equity/total liabilities) +1*(Sales/tangible assets) +1.2*(Working capital/tangible assets) +1.4*(retained earnings/tangible assets)]. (Source: Bloomberg)

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[1] Following the final version of Sarbanes Oxley act 2002 classifications of financial Experts we included financial experts under two categories: a) Accounting financial expert (ACFE)—thus all directors with experience as a public accountant, auditor, principal or chief financial officer, controller, or principal or chief accounting officer; b) Non accounting financial experts (NACFE) include all directors with supervisory experience as the CEO, managing director, president, chief operating officer etc. (These categories are inferred from the final version of SOX 2002)

3.21 Data

Similar to my first chapter, the data for this chapter comprises of firm level data involving accounting data, finance data and handpicked managerial level data collected from Bloomberg database. The managerial level data includes; first, the background education (academic, professional, etc.) of individuals AC members of the 311 FTSE companies in our dataset from 2007 -2016. Second, the background experience (general experience, industry specific experience, firm specific experience etc.) of individuals audit committee member of the 311 FTSE companies in our dataset from 2007-2016. My original dataset comprises of all the 350 FTSE companies operating from periods between 2007 and 2016. After data cleaning which involves deleting firms with missing data, deleting inconsistent and extreme values (by identifying and addressing issues related to outliers), I ended up with 311 firms consisting of 3,110 firm-year observations in a balanced panel format. Following previous literature (example; Santos, 2010; Akbar *et al* 2013; Aldamen *et al* 2012) I divided my dataset in this chapter into two periods. First, periods of economic uncertainty covering the years 2007–2009 (Akbar *et al* 2013; Aldamen et al., 2012). Second periods of stability (post crisis periods covering 2010-2016. To test for AC effectiveness on restricting managerial opportunistic behaviours such as earnings management, First, I examine my data for the possibilities of earnings management using the modified Jones method. Using the modified Jones methods I performed two regressions both during the crisis periods and post crisis periods to examine AC effects on earnings management. As my study employ panel data to examine firm level and managerial level data, there is the possibility for unobserved heterogeneity and endogeneity problems. Following Hair et al 2017, my empirical approach addresses the problem of unobserved heterogeneity and endogeneity by using measurement model and structural model that includes testing for convergent and discriminant validity, internal

consistency reliability, and HTMT and AVE figures; as shown in the tables 3.15and 3.16 below

3.22 Empirical construct and hypothesis development

3.22.1 Corporate performance

I examine the contributions of the audit committee characteristics (accounting finance expert, non-accounting financial expert, independent executive directors, AC chair experience, executive compensation and corporate governance sustainability disclosure) on the financial health of firms as well as on the overall market value of firms. Most literature on corporate governance to date is restricted to period of stability. For example, the sample of Gompers *et al.* (2003) was drawn from the period between 1990 to 1999 and the recovery period after the 1987 dot-com collapse (Gompers et al., 2003). The sample of Core *et al.* (2006) was drawn from the 1997 fiscal year prior to the 2000 stock market recovery (Core et al., 2006). Aldamen's (2012) sample only focused on the periods of the global financial crisis 2008–2009 (Aldamen et al., 2012). I extend the corporate governance literature by exploring further results from periods of both during and after economic uncertainty. Further, I employ Altman's modified Z-score, which measures the financial sustainability of the firms or the likelihood of firms going bankrupt (Rodgers *et al.*, 2013). My proxy for firms' future growth options is Tobin's Q, which is the ratio of the market value of the firm to the replacement value of its assets (Berger *et al.*, 2014; Kor *et al*., 2005; Rajagopalan and Spreitzer, 1997; Clint *et al*., 2014; Boeker, 1997, Wiersema *et al*., 1992; Datta *et al*., 2003; Pol Herrmann *et al*., 2014; S Darmadi *et al*., 2011). Investors require quality accounting information to make informed investment decisions, especially during periods of economic uncertainty. I hypothesise that:

H1a: There is a positive association between accounting information and firm value during periods of economic stability.

H1b: The positive association between accounting information and firm value is higher during periods of economic instability compared to during stable times.

I test all my hypothesis in two main ways. First, I do a regression covering the period of economic instability from 2007 to 2009. Second, I do a regression covering the period from 2009 to 2016.

3.22.2 Accounting finance experts

Following Defond *et al*. (2005), I capture accounting financial experts by following the SOX 2002(a) definition of a financial expert, thus all directors with experience as qualified or certified public accountant (CPA, ACCA, CIMA, ICAEW, etc.), auditor, principal or chief financial officer, financial controller, principal or chief accounting officer. The above categories are inferred from the final version of SOX 2002 drafted by SEC. An important dimension of AC effectiveness that has gained significant attention from academics and regulators is the accounting financial expert (Dhaliwal et al., 2010). Section 407 of SOX requires the security and exchange commission (SEC), as does the UK Corporate Governance Code 2016, requires all public firms to include at least one individual with accounting or auditing experience on the AC. The resource-based view, knowledge-based view and the resource dependency theory imply that including a qualified certified accounting on the audit committee can enhance the quality of the financial reporting process. The agency theory emphasises that the presence of an accounting expert on the board can improve the capacity if AC members understand technical accounting issues and help constrain earnings management. Accounting experts constitute a valuable asset to the board because AC members are responsible for tasks that require a higher degree of accounting sophistication (DeFond et al., 2005).

Accounting experts mostly have unique accounting skills (Turley & Zaman, 2007; Dhaliwal et al., 2010), relevant financial expertise (Beasley et al., 2009; Dhaliwal et al., 2010; Aldamen et al., 2012) and experience in financial accounting and reporting process to effectively promote a quality financial reporting process (DeFond et al., 2005; Beasley et al., 2009; Dhaliwal et al., 2010; Aldamen et al., 2012). Accounting certified financial experts provide valuable advice, especially during periods of economic uncertainties about cost and risk issues (Krishnan & Visvanathan, 2009). This leads us to my hypothesis that:

H2a: There is a positive association between accounting certified financial experts and firm value during periods of economic stability.

H2b: The positive association between accounting certified financial experts and firm value is higher during periods of economic instability compared to during stable times.

H2c: There is a positive association between accounting certified financial experts and financial health during periods of economic stability.

H2d: The positive association between accounting certified financial experts and financial health is higher during periods of economic instability compared to during stable times.

3.22.3 Non-accounting financial experts

Following the previous literature, including Dhaliwal *et al*. (2012) and Defond *et al*. (2005), I dichotomised non-accounting financial experts to include all directors with experience such as CEO, COO, chairman, president, and managing director. Thus, following the final SEC rule on the definition of financial experts, I broaden my definition for non-accounting financial experts to include directors who have experience in actively supervising a principal financial accountant, chief accounting officer, financial controller, auditor, etc. Further, all directors who oversee the performance of companies or

accountants in relation to the preparation of financial statements, evaluations and interpretation of accounts and auditing are classified as non-accounting financial experts (DeFond et al., 2005). The SEC initially proposed a narrow definition of financial experts which only emphasised accounting financial experts. The broader definition of financial experts by SOX has resulted in mixed results in relation to the association between AC finance experts and corporate performance. Some scholars argue that most ACs are fundamentally influenced by the chief executive officers or the managing directors; as a result it is inconsequential to focus the definition of finance experts on only accounting certified experts (Abernathy et al., 2014). Further, accounting certified finance experts are becoming more involved in strategic planning in comparison to their financial oversight responsibilities (Abernathy et al., 2014). Therefore, depending on their strategic orientation most companies are beginning to adopt a new revised role for audit committee financial experts that places less emphasis on qualified accounting certification (Abernathy et al., 2014). I therefore include both accounting certified and non-accounting certified financial experts in my analysis in order to provide a better insight into the effectiveness of the two main classifications of financial experts (accounting certified financial experts and non-accounting certified financial experts). Like their counterparts, the non-accounting certified financial experts have some valuable experience and financial management skills that can be useful, especially during periods of economic uncertainty. I hypothesise that:

H3a: There is a positive association between non-accounting certified financial experts and firm value during periods of economic stability.

H3b: The positive association between non-accounting certified financial experts and firm value is higher during periods of economic instability compared to during stable times.

H3c: There is a positive association between non-accounting certified financial experts and financial health during periods of economic stability.

H3d: The positive association between non-accounting certified financial experts and financial health is higher during periods of economic instability compared to during stable times.

3.22.4 Audit committee chair (ACC)

Following the previous literature (Aldamen et al., 2012; Abernathy et al., 2014), I measure ACC experience by their qualification (education background) and years of experience as chair of an audit committee. The audit committee chair is responsible for the AC oversight function and the financial reporting process (Abernathy et al., 2014). The ACC is the first point of contact between the AC and the board as well as the internal and external auditors. Therefore, I argue that the effectiveness of the AC is largely dependent on the capabilities, skills, experience and influence of the ACC on the board. The agency theory implies that the personality characteristics of the ACC play a crucial role in determining the effectiveness of the AC (DeZoort et al., 2002; Beasley et al., 2009; Krishnan & Visvanathan, 2009; Aldamen et al., 2012; Barka & Legendre, 2017). For example, an ACC who is more knowledgeable and experienced will not be so easily manipulated by management and can therefore constrain opportunistic transactions (DeZoort et al., 2002). Further Hakka and Chalos (1990) surveyed the perception of audit committee chairs, management, external auditors and internal auditors about the agency conflict. Their findings suggest that ACC opinions about issues relating to choices of accounting policies and procedures mostly differ from that of management and auditors (Haka & Chalos, 1990). Further, Dezoort *et al*. (2002) argue that the effectiveness of the AC hinges on resources, diligence and authority. However, it is the authority of the AC that provides them with necessary capability to add value to the firm (DeZoort et al., 2002). I argue that a well-qualified and experienced AC represents a valuable asset to

firms, especially during periods of economic uncertainty. This belief is derived from the knowledge-based view, which posits that most firms rely on the unique, rare and valuable knowledge of the AC, especially during periods of economic instability. This led us to the hypothesis that:

H4a: There is a positive association between audit committee chair experience and firm value during periods of economic stability.

H4b: The positive association between audit committee chair experience and firm value is higher during periods of economic instability compared to during stable times.

H4c: There is a positive association between audit committee chair experience and financial health during periods of economic stability.

H4d: The positive association between audit committee chair experience and financial health is higher during periods of economic instability compared to during stable times.

3.22.5 Corporate sustainability disclosure

Following the prior literature, I measure corporate sustainability disclosure (CSD) in relation to the extent of company's Growth, Environment, Social and Governance disclosure. To survive, firm should not only show growth prospects but must also provide adequate disclosure about their impact on the environment, commitment to their local communities and their corporate governance systems (Deegan, 2002; Artiach et al., 2010; Michelon, 2011; Harrison & Wicks, 2013; Herbohn et al., 2014). I used the Bloomberg corporate sustainability disclosure score, which measure the extent of a company's environment, social and governance disclosure to measure CSD. The legitimacy theory implies that highly sustainable companies are more likely to communicate their goals and aspirations to their stakeholders through corporate sustainability disclosure (Eccles et al., 2014). Further, some scholars argue that companies that meet the needs of their non-shareholding stakeholders ultimately create shareholder value (Freeman et al., 2010;

Porter & Kramer, 2011). They assume that a failure to meet non-shareholders' needs can lead to a consumer boycott and other associated reputational costs (Jensen, 2010; Harrison & Wicks, 2013). In contrast, other scholars argue that addressing environmental and social issues can destroy shareholder wealth due to their associated cost (Galaskiewicz, 1997; Brown et al., 2006). Further, they assume that sustainability involves agency cost because the managers receive private benefits (maximise their opportunistic interest) from addressing environmental and social issues (Brown *et al.*, 2006). The prior literature shows that highly sustainable companies are characterised by a distinct corporate governance model (Deegan & Blomquist, 2006; Nordin & Hamid, 2013; Loh et al., 2017; Wang, 2017). Mostly, such companies adopt a greater range of stakeholder engagement (Jensen, 2010; Harrison & Wicks, 2013). The extant corporate governance literature posits that a wider stakeholder engagement is directly linked to superior corporate performance (Deegan & Blomquist, 2006; Min Foo, 2007; Michelon, 2011; Cheng et al., 2014a). Strategic management scholars argue that when a firm is credibly committed to contracting with its stakeholders on the basis of mutual trust with a long-term horizon, then that firm will ultimately experience reduced agency cost and transaction cost and ultimately experience superior performance (Min Foo, 2007; Cheng et al., 2014a). I hypothesised that:

H5a: There is a positive association between corporate sustainability disclosure and firm value during periods of economic stability.

H5b: The positive association between corporate sustainability disclosure and firm value is higher during periods of economic instability compared to during stable times.

H5c: There is a positive association between corporate sustainability disclosure and financial health during periods of economic stability.

H5d: The positive association between corporate sustainability disclosure and financial health is higher during periods of economic instability compared to during stable times.

3.22.6 Executive compensation

The extant corporate governance literature argues that the effectiveness of the AC is predicated upon their level of expertise and experience (DeZoort et al., 2002; DeFond et al., 2005; Beasley et al., 2009; Engel et al., 2010; Aldamen et al., 2012; Li et al., 2012). In furtherance to this argument, some scholars argue that to be able to attract highly skilled and experienced AC members, companies have to pay higher compensation (Vafeas & Waegelein, 2007; Engel et al., 2010; Wysocki, 2010). Further, recent high profile financial reporting scandals have called for a higher demand for monitoring the financial reporting process (Engel et al., 2010), while SOCX 2002 and the UK Corporate Governance Code have tighten the rules regarding the need to include directors with extensive knowledge and experience in finance, accounting and auditing on the audit committee (Vafeas & Waegelein, 2007; Engel et al., 2010; Wysocki, 2010). Further, both SOX 2002 and the UK Corporate Governance Code 2016 require that all members on the AC should be independent and that the company's annual report should disclose whether a member of the audit committee is a financial expert. These requirements are likely to lead to a decrease in the supply of an increase in the demand for qualified directors serving on the audit committee (Engel et al., 2010). Companies that demand higher monitoring processes have to pay higher compensation to attract high quality AC members with relevant financial expertise to their board (Engel et al., 2010; Wysocki, 2010). Further, the directors with the relevant financial expertise and experience who opt to serve as AC members are confronted with reputational risk (Engel et al., 2010). The agency theory implies that agents who are exposed to higher risk require high risk premiums (high compensation). In furtherance to the above reasons, I argue that audit committee

compensation is related to both the level of demand for monitoring the financial reporting process and the expertise level of the AC. Most firms within my sample are associated with financial reporting complexities that require highly qualified directors and experienced ACs that can monitor the financial reporting process (Engel et al., 2010; Wysocki, 2010). This situation will then influence the need to attract experienced directors to manage these complex operations as well as highly qualified AC members to monitor the financial reporting process (Vafeas & Waegelein, 2007; Engel et al., 2010; Wysocki, 2010). This situation will lead to the prediction of a positive association between executive compensation and auditor compensation (Wysocki, 2010). Against the backdrop of the above arguments, I hypothesize that:

H6a: There is a positive association between the value of executive compensation and firm value during periods of economic stability.

H6b: The positive association between the value of executive compensation and firm value is higher during periods of economic instability compared to during stable times.

H6c: There is a positive association between the value of executive compensation and financial health during periods of economic stability.

H6d: The positive association between the value of executive compensation and financial health is higher during periods of economic instability compared to during stable times.

3.22.7 Other considerations

Accounting information – Agency theory implies that firms with a strong audit committee can effectively monitor the activities of management in a way that reduces transaction cost as well as maximizes returns on shareholders' investment (Fama & Jensen, 1983a). Accounting and financial reporting information is a mechanism used by management to communicate their trust to investors, especially during periods of economic uncertainty.

When directors prepare financial reports and disclose transactions, they are communicating trust. Financial ratios aim at providing assurance to stakeholders about the need to trust directors for the foreseeable future. Accounting information, therefore, constitutes an important knowledge asset for the organization because it can be used by investors to judge the financial health of firms. Further, according to legitimacy theory, accounting information serves as a communication apparatus used by directors to legitimize the activities of the company. I use accounting-based measures of profitability, liquidity, efficiency and solvency ratios as benchmarks to measure the financial position and health of firms. Return on assets (ROA) and return on equity (ROE) are used to construct overall profitability (Berger *et al*., 2014; Rodgers *et al*., 2013; Hitt *et al*., 1991; Darmadi, *et al* 2011; Volonte *et al*., 2016), the current ratio, cash ratio and quick ratio are used to construct overall liquidity (Rodgers *et al*., 2013), debt to equity and debt to assets are used to construct overall leverage, and asset turnover and sales to assets are used to construct overall efficiency (Li and Tang, 2010). The definitions of variables are provided in Table 3.10

3.23 Model formulation

Following my research questions and objectives, I developed the models below to test my research hypotheses. My models 1-8 examine different combinations of AC attributes together with executive compensation and disclosure and their effect on corporate financial health and firm value. Further, I compare my results (during the financial crisis and post financial crisis) to draw key findings that support or reject my hypotheses.

Model (1) (Finance Experts combined with Executive Compensation and Disclosure)

$$Tobin'sQ_{it} = \alpha_{it}\, \beta_1 ACFE + \beta_2\, NACFE_{it}\ + \beta_4\, EXECOMP_{it} + \beta_5\, CHIREXP_{it} +$$
$$\beta_6\, Profitability\ ratio_{it} + \beta_7\ Efficiency\ ratio_{it} + \beta_8\, Leverage_{it} +$$
$$\beta_9\ Liquidity\ ratio_{it} + \varepsilon_{it} \hspace{4cm} (1)$$

Model (2) (Non Accounting Finance Expert)

$Tobin's Q_{it} = \alpha_{it} + \beta_1 NACFE + \beta_2 DISCLOSURE_{it} + \beta_3 EXECOMP_{it} + \beta_4 CHIREXP_{it} + \beta_5 Profitability\ ratio_{it} + \beta_6 Efficiency\ ratio_{it} + \beta_7 Leverage_{it} + \beta_8 Liquidity\ ratio_{it} + \varepsilon_{it}$ \hfill (2)

Model (3) (Accounting Finance Expert)

$Tobin's Q_{it} + \beta_1 ACFE_{it} + \beta_2 DISCLOSURE_{it} + \beta_3 EXECOMP_{it} + \beta_4 CHIREXP_{it} + \beta_5 Profitability\ ratio_{it} + \beta_6 Efficiency\ ratio_{it} + \beta_7 Leverage_{it} + \beta_8 Liquidity\ ratio_{it} + \varepsilon_{it}$ \hfill (3)

Model (4) (Finance Expert and No Disclosure)

$Tobin's Q_{it} = \alpha_{it} + \beta_1 ACFE + \beta_2 NACFE_{it} + \beta_3 CHIREXP_{it} + \beta_4 COMPENSATION_{it} + \beta_5 Profitability\ ratio_{it} + \beta_6 Efficiency\ ratio_{it} + \beta_7 Leverage_{it} + \beta_8 Liquidity\ ratio_{it} + \varepsilon_{it}$ \hfill (4)

Model (5) (Finance Expert and No Executive and no Compensation)

$Tobin's Q_{it} = \alpha_{it} + \beta_1 ACFE + \beta_2 NACFE_{it} + \beta_3 DISCLOSURE_{it} + \beta_4 CHIREXP_{it} + \beta_5 Profitability\ ratio_{it} + \beta_6 Efficiency\ ratio_{it} + \beta_7 Leverage_{it} + \beta_8 Liquidity\ ratio_{it} + \varepsilon_{it}$ \hfill (5)

Model (6) (Executive Compensation and Disclosure)

$Tobin's Q_{it} = \alpha_{it} + \beta_1 DISCLOUSRE + \beta_2 EXECOMP_{it} + \beta_3 Profitability\ ratio_{it} + \beta_4 Efficiency\ ratio_{it} + \beta_5 Leverage_{it} + \beta_6 Liquidity\ ratio_{it} + \varepsilon_{it}$ \hfill (6)

Model (7) (Finance Experts and Disclosure)

$Tobin's Q_{it} = \alpha_{it} + \beta_1 ACFE + \beta_2 DISCLOSURE_{it} + \beta_3 EXECOMP_{it} + \beta_4 TMT\ CHIREXP_{it} + \beta_5 Profitability\ ratio_{it} + \beta_6 Efficiency\ ratio_{it} + \beta_7 Leverage_{it} + \beta_8 Liquidity\ ratio_{it} + \varepsilon_{it}$ \hfill (7)

Model (8) (Non Accounting Finance Experts and Disclosure)

$$Tobin'sQ_{it} = \alpha_{it} + \beta_1 NACFE + \beta_2 DISCLOSURE_{it} + \beta_3 EXECOMP_{it} + \beta_4 CHIREXP_{it} + \beta_5 Profitability\ ratio_{it} + \beta_6\ Efficiency\ ratio_{it} + \beta_7 Leverage_{it} + \beta_8\ Liquidity\ ratio_{it} + \varepsilon_{it} \quad (8)$$

Model (9) (Control for Age of Firms)

$$Tobin'sQ_{it} = \alpha_{it} + \beta_1 ACFE + \beta_2 NACFE_{it} + \beta_3 DSCLOSURE_{it} + \beta_4 EXECOMP + \beta_5 CHIREXP + \beta_6 Profitability\ ratio_{it} + \beta_7\ Efficiency\ ratio_{it} + \beta_8 Leverage_{it} + \beta_9\ Liquidity\ ratio_{it} + LogAge\ of\ firm + \varepsilon_{it} \quad (9)$$

3.10.9 Lagged effects for corporate financial health and firm value on key constructs

Model (1) – I lagged Tobin's Q and financial health and examined their effects on corporate disclosure.

$$Current\ Disclosure_{it} = \alpha_{it} + \beta_1 laggedTobin'sQ + \beta_5 Profitability\ ratio_{it} + \beta_6 Efficiency\ ratio_{it} + \beta_7 Leverage_{it} + \beta_8\ Liquidity\ ratio_{it} + \varepsilon_{it} \quad (1^*)$$

Model (2) – I lagged Tobin's Q and financial health and examined their effects on executive compensation.

$$Executive\ Compensation_{it} = \alpha_{it} + \beta_1 laggedTobin'sQ + \beta_5 Profitability\ ratio_{it} + \beta_6 Efficiency\ ratio_{it} + \beta_7 Leverage_{it} + \beta_8\ Liquidity\ ratio_{it} + \varepsilon_{it} \quad (2^*)$$

Model (3) – I lagged Tobin's Q and financial health and examined their effects on executive compensation and disclosure.

$$Executive\ Compensation_{it} + Disclosure = \alpha_{it} + \beta_1 laggedTobin'sQ + \beta_5 Profitability\ ratio_{it} + \beta_6 Efficiency\ ratio_{it} + \beta_7 Leverage_{it} + \beta_8\ Liquidity\ ratio_{it} + \varepsilon_{it} \quad (3^*)$$

Model (4) – I lagged Tobin's Q and financial health and examined their effects on executive accounting certified finance experts effectiveness.

$$ACFE\ EFFECTIVENESS_{it} = \alpha_{it} + \beta_1 laggedTOBIN'S\ Q + \beta_2\ Lagged\ Z - SCORE_{it} + \beta_3\ Current\ ACFE_{it} + \beta_4\ Current\ NACFE_{it} + \beta_5\ Current\ DISCLOSURE_{it} + \beta_6 laggedProfitability\ ratio_{it} + \beta_7 lagged\ Efficiency\ ratio_{it} + \beta_8 lagged\ Leverage_{it} + \beta_9\ lagged\ Liquidity\ ratio_{it} + \varepsilon_{it} \quad (4^*)$$

The correlation matrix during crisis period and post crisis period are presented below in table 3.11 and 3.12 respectively. I refer to the crisis period also as periods of uncertainties and post crisis periods as stable times. Global financial crisis (GFC) is the same as periods of uncertainties. The differences between the two are quite evident in relation to the returns and liquidity ratios between periods of uncertainties and stable periods. The liquidity and returns of firms during stable periods are better than during periods of uncertainties. My regression results (PLS-SEM results) in table 3.13 and 3.14 (for periods of uncertainties and stable periods respectively) provide further empirical evidence about the effects of AC attributes on firm outcomes (corporate performance and firm value). Further table 3.11 and 3.12 provides discriminant validity test for my indicators for my models during and post crisis periods respectively.

Table 3. 11 Correlation matrix during GFC

Indicator	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)	1													
(2)	0.426**	1												
(3)	-0.043	-0.059*	1											
(4)	-0.075*°	-0.081**	0.072*	1										
(5)	0.095*	-0.048*	0.159**	0.188**	1									
(6)	0.065*	-0.018	0.015	0.049*	0.005	1								
(7)	0.093*	0.012	0.038*	0.223**	0.176**	-0.013	1							
(8)	0.048*	-0.022	0.010	0.155**	0.243**	-0.195**	0.132**	1						
(9)	0.175**	0.156**	0.156**	0.254**	0.272**	0.316**	0.604**	0.532**	1					
(10)	0.817**	0.338**	-0.024*	-0.026*	0.276**	-0.020	0.160**	0.055*	-0.034	1				
(11)	0.732**	0.238**	0.024*	-0.155**	-0.022*	-0.009	-0.080*	0.014	0.048*	.760**	1			
(12)	0.836**	0.218**	-0.028*	-0.029*	0.002	-0.009	-0.055*	0.046*	-0.022*	.975**	.812**	1		
(13)	-0.011	0.541**	-0.170**	-0.197**	-0.167**	-0.037*	-0.011	-0.056*	-0.059**	-0.020	-0.006	-0.035*	1	
(14)	-0.003	0.640**	-0.087**	-0.058*	-0.042*	-0.159**	0.033*	-0.037*	-0.023*	-0.007	-0.021*	-0.026	0.872**	1
(15)	0.005	0.616**	-0.180**	-0.185**	-0.045*	-0.050*	0.021*	-0.042*	-0.029*	-0.006	-0.003	-0.021	0.891**	0.979**
(16)	0.249**	0.053*	0.152**	-0.219**	-0.056*	0.012	-0.145**	-0.001	0.050*	.216**	0.257**	0.236**	-0.163**	-0.145**
(17)	0.246**	0.036*	0.177**	-0.206**	-0.035	0.176**	-0.158**	0.006	0.046*	.213**	0.259**	0.243**	-0.184**	-0.165**
(18)	-0.155**	-0.179**	-0.046*	-0.179**	0.020	-0.022*	0.033*	-0.015	-0.003	0.046*	-0.177**	0.009	-0.051*	-0.035*
(19)	-0.158**	-0.250**	-0.155**	0.051*	0.004	-0.006	0.021*	0.031*	-0.047*	-0.031*	-0.202**	-0.159**	-0.164**	-0.165**
(20)	-0.036*	-0.151**	0.033*	0.337**	0.316**	0.012	0.207**	.0171**	0.268**	-0.012	0.006	0.022*	-0.159**	-0.118**

	(15)	(16)	(17)	(18)	(19)	(20)
(16)	-0.155**	1				
(17)	-0.161**	0.994**	1			
(18)	-0.042	-0.172**	-0.032*	1		
(19)	-0.199**	-0.182**	-0.164**	0.354**	1	
(20)	-0.152**	-0.199**	-0.193**	-0.011	-0.042*	1

Notes. Tobin's Q (1); Z-Score (2); Firm Age (3); Board size (4); Independent directors (5); Accounting Finance experts (6); Non accounting finance Expert (7); MBA (8); Audit committee chair experience (9); Sustainability disclosure (10); Return on assets (11); Return on equity (12); Current ratio (13); Cash ratio (14); Quick ratio (15); Debt to equity (16); Debt to assets (17); Assets turnover (18); Sales to net assets (19); CEO compensation (20). The asterisk * (**) shows that the Pearson coefficient is significant at the 5% (1%) level (two-tailed). See Table 1 for the definition of the variables.

Table 3. 12 Correlation matrix post GFC

Indicator	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)	1													
(2)	0.190**	1												
(3)	0.074*	-0.029*	1											
(4)	-0.151*	-0.138*	0.040*	1										
(5)	0.042*	0.017	0.150**	0.074*	1									
(6)	0.108*	-0.031*	0.085*	0.030	0.038*	1								
(7)	0.085*	0.129*	0.061*	0.243**	0.184**	0.036*	1							
(8)	0.087*	-0.018	0.001	0.150**	0.131*	-0.055	0.266**	1						
(9)	0.094*	0.121*	0.084*	0.247**	0.181**	0.334**	0.652**	0.552**	1					
(10)	0.306**	-0.007	0.012	-0.102*	-0.049*	-0.141*	-0.072*	-0.091*	-0.135*	1				
(11)	0.622**	-0.001	0.082*	-0.176**	0.004	0.106*	-0.102*	-0.074*	-0.070*	0.522**	1			
(12)	0.513**	-0.011	0.030*	-0.161*	-0.023*	0.045*	-0.010	-0.129*	-0.045*	0.863**	0.780**	1		
(13)	-0.006	0.916**	-0.078*	-0.165*	0.079*	-0.029*	0.118*	-0.038*	0.024*	-0.092*	0165**	-0.144*	1	
(14)	0.034*	0.953**	-0.118*	-0.076*	0.049*	-0.066*	0.148*	-0.009	0.030*	-0.035*	-0.143*	-0.107*	0.959**	1
(15)	0.036*	0.932**	-0.119*	-0.131	0.072*	-0.047*	0.122*	-0.025*	0.021	-0.057*	-0.128	-0.094*	0.980**	0.974**
(16)	0.284**	0.005	0.081*	-0.267**	-0.143*	0.021	-0.164**	-0.096*	-0.110*	0.255**	0.329**	0.370**	-0.161*	-0.150**
(17)	0.264**	-0.047*	0.079*	-0.245**	-0.132*	0.136*	-0.070*	-0.064*	-0.090*	0.264**	0.299**	0.353**	-0.186**	0-.180**
(18)	-0.072*	-0.075*	-0.055*	0.067*	0.025*	0.025*	-0.011	-0.017	-0.024*	0.272**	-0.067*	-0.073*	-0.057	-0.045*
(19)	-0.146*	-0.252**	-0.049*	0.028*	0.037*	0.129*	0.007	-0.002	-0.070*	0.078*	-0.302**	0.159**	-0.157**	-0.159**
(20)	-0.013	-0.158**	0.048*	0.207**	0.203**	0.080*	0.161**	0.050*	0.211**	0.006	0.095*	0.151**	-0.179**	-0.147*

	(15)	(16)	(17)	(18)	(19)	(20)
(16)	-0.143*	1				
(17)	-0.176**	0.990**	1			
(18)	-0.040*	-0.105*	-0.012	1		
(19)	-0.131*	-0.141*	0.090*	0.388**	1	
(20)	-0.155*	-0.111*	-0.100*	0.010	0.018	1

Notes. Tobin's Q (1); Z-Score (2); Firm Age (3); Board size (4); Independent directors (5); Accounting Finance experts (6); Non accounting finance experts (7); MBA (8); Audit committee chair experience (9); Sustainability disclosure (10); Return on assets (11); Return on equity (12); Current ratio (13); Cash ratio (14); Quick ratio (15); Debt to equity (16); Debt to assets (17); Assets turnover (18); Sales to net assets (19); CEO compensation (20). The asterisk * (**) Shows that the Pearson coefficient is significant at the 5% (1%) level (two-tailed). See Table 1 for the definition of the variables.

Table 3. 13 PLS-SEM Results -during GFC

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	PLS-SEM results for financial health and firm value during Financial crisis								
Accounting Expert >Tobin's Q	0.039		0.143	0.067	0.197		0.098		0.143
	[0.465]	-	[0.057]	[0.122]	[0.017]	-	[0.100]	-	[0.051]
Accounting Expert > Z-score	0.048		0.134	0.122	0.120		0.107		0.111
	[0.398]	-	[0.058]	[0.035]	[0.062]	-	[0.095]	-	[0.058]
Non Accounting Expert >Tobin's Q	0.057	0.108		0.95	0.095			0.091	0.128
	[0.308]	[0.098]	-	[0.103]	[0.097]	-	-	[0.049]	[0.056]
Non Accounting Expert > Z-score	-0.201	-0.232		0.195	0.163			0.163	0.199
	[0.012]	[0.010]	-	[0.000]	[0.049]	-	-	[0.035]	[0.014]
Sustainability Disclosure >Tobin's Q		0.148	0.251		0.189	0.242	0.213	0.233	0.161
	-	[0.053]	[0.008]	-	[0.018]	[0.009]	[0.010]	[0.008]	[0.046]
Sustainability Disclosure >Z-Score		0.276	0.280		0.251	0.106	0.114	-0.105	-0.268
	-	[0.010]	[0.005]	-	[0.009]	[0.101]	[0.051]	[0.056]	[0.010]
Exec. Compensation >Tobin's Q	-0.016	-0.040	0.041	0.032		0.064			0.033
	[0.615]	[0.409]	[0.419]	[0.489]	-	[0.110]	-	-	[0.147]
Exec. Compensation >Z-score	0.265	0.249	0.254	0.156		-0.013			0.239
	[0.010]	[0.013]	[0.007]	[0.054]	-	[0.543]	-	-	[0.014]
AC Chair Experience > Tobin's Q		0.107	0.106	0.087	0.106	0.078	0.197		0.106
		[0.099]	[0.101]	[0.117]	[0.101]	[0.102]	[0.053]		[0.094]
AC Chair Experience > Z-score		0.065	0.098	0.065	0.151	0.047	0.055		0.098
		[0.109]	[0.103]	[0.209]	[0.054]	[0.112]	[0.110]		[0.106]
Liquidity > Z-score	0.165	0.175	0.242	0.117	0.143	0.135	0.156	0.138	0.169
	[0.051]	[0.053]	[0.009]	[0.099]	[0.056]	[0.051]	[0.057]	[0.049]	[0.047]
Profitability >Z-score	0.495	0.501	0.619	0.247	0.326	0.504	0.481	0.324	0.499
	[0.000]	[0.000]	[0.000]	[0.012]	[0.000]	[0.000]	[0.000]	[0.003]	[0.000]
Efficiency > Z-score	0.161	0.164	0.116	0.175	0.119	0.129	0.076	0.071	0.153
	[0.049]	[0.058]	[0.057]	[0.058]	[0.002]	[0.059]	[0.103]	[0.123]	[0.056]
Leverage > Z-score	-0.275	-0.286	-0.259	-0.324	-0.551	-188	-0.176	-0.547	-0.282
	[0.009]	[0.010]	[0.009]	[0.002]	[0.000]	[0.051]	[0.058]	[0.000]	[0.014]
Z-score>Tobin's Q	0.662	0.866	0.875	0.673	0.699	0.630	0.650	0.629	0.866
Adjusted R^2:									
Z-score	0.575	0.576	0.589	0.489	0.587	0.304	0.276	0.590	0.566
Tobin's Q	0.467	0.588	0.703	0.698	0.816	0.513	0.516	0.816	0.708

Notes. The figures in the brackets are the p-values. **Model (1)** considers financial expert (accounting and non-accounting) but excludes AC chair experience **Model (2)** We exclude accounting finance expert but includes sustainability disclosure and AC chair experience in model (1). **Model (3)** excludes non-accounting finance experts but include accounting finance expert, corporate sustainability disclosure, executive compensation and AC chair experience. **Model (4)** uses model (3) but include non-accounting finance expert and exclude corporate sustainability disclosure. **Model (5)** Uses model (4) but includes corporate sustainability disclosure and excludes executive compensation. **Model (6)** excludes both accounting finance and non-accounting finance experts but includes sustainability disclosure, executive compensation and AC chair experience. **Model (7)** uses model (6) but includes accounting finance experts and excludes executive compensation. **Model (8)** includes only accounting finance experts and corporate sustainability disclosure. **Model (9)** Includes all our latent constructs (accounting finance experts, non-accounting finance experts, corporate sustainability disclosure, and executive compensation and AC chair experience. See Table 3.1 for the definition of the variables. The HTMT criteria are reported in the Appendix.

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Table 3. 14 PLS-SEM Results post GFC

Table 3. PLS-SEM results for financial health and firm value Post Financial crisis									
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Accounting Expert >Tobin's Q	0.048		0.126	0.111	0.177		0.115		0.173
	[0.392]	-	[0.059]	[0.099]	[0.052]	-	[0.101]	-	[0.047]
Accounting Expert > Z-score	0.079		0.187	0.143	0.138		0.181		0.237
	[0.118]	-	[0.018]	[0.053]	[0.058]	-	[0.049]	-	[0.010]
Non Accounting Expert >Tobin's Q	0.061	0.155		0.031	0.161			0.055	0.125
	[0.148]	[0.052]	-	[0.309]	[0.054]	-	-	[0.149]	[0.058]
Non Accounting Expert > Z-score	0.054	0.199		0.069	0.182			0.199	0.249
	[0.162]	[0.049]	-	[0.153]	[0.049]	-	-	[0.049]	[0.011]
Sustainability Disclosure >Tobin's Q		0.374	0.296		0.336	0.323	0.200	0.377	0.367
	-	[0.003]	[0.008]	-	[0.008]	[0.005]	[0.016]	[0.005]	[0.008]
Sustainability Disclosure >Z-Score		0.127	0.293		0.151	0.132	0.117	0.127	0.173
	-	[0.055]	[0.005]	-	[0.059]	[0.099]	[0.097]	[0.058]	[0.019]
Exec. Compensation >Tobin's Q	0167	0.173	0.276	0.117		0.012			0.221
	[0.053]	[0.051]	[0.419]	[0.097]	-	[0.610]	-	-	[0.041]
Exec. Compensation >Z-score	0.224	0.169	0.175	0.152		0.082			0.228
	[0.011]	[0.050]	[0.017]	[0.057]	-	[0.113]	-	-	[0.023]
AC Chair Experience > Tobin's Q		0.058	0.144	0.102	0.156	0.139	0.059		0.151
		[0.149]	[0.098]	[0.108]	[0.054]	[0.096]	[0.161]		[0.049]
AC Chair Experience > Z-score		0.119	0.199	0.032	0.119	0.390	0.086		0.079
		[0.061]	[0.049]	[0.459]	[0.010]	[0.002]	[0.113]		[0.118]
Liquidity > Z-score	0.558	0.586	0.376	0.492	0.433	0.379	0.388	0.586	0.645
	[0.000]	[0.000]	[0.009]	[0.001]	[0.004]	[0.001]	[0.007]	[0.000]	[0.000]
Profitability >Z-score	0.137	0.155	0.233	0.151	0.145	0.294	0.306	0.156	0.193
	[0.087]	[0.053]	[0.010]	[0.055]	[0.058]	[0.010]	[0.009]	[0.054]	[0.000]
Efficiency > Z-score	0.286	0.248	0.176	0.207	0.278	0.185	0.200	0.248	0.156
	[0.012]	[0.004]	[0.054]	[0.015]	[0.014]	[0.052]	[0.049]	[0.011]	[0.053]
Leverage > Z-score	-0.447	-0.469	-0.399	-0.310	-0.484	-0.192	-0.167	-0.469	-0.441
	[0.000]	[0.002]	[0.004]	[0.008]	[0.003]	[0.054]	[0.058]	[0.004]	[0.001]
Z-score>Tobin's Q	0.682	0.676	0.787	0.599	0.729	0.541	0.564	0.676	0.680
Adjusted R^2:									
Z-score	0.601	0.593	0.520	0.472	0.567	0.359	0.381	0.583	0.626
Tobin's Q	0.567	0.583	0.718	0.410	0.555	0.456	0.487	0.478	0.585

Notes. The figures in the brackets are the *p*-values. **Model (1)** considers financial expert (accounting and non-accounting) but excludes AC chair Experience **Model (2)** We exclude accounting finance expert but includes sustainability disclosure and AC chair experience in model 1. **Model (3)** excludes non-accounting finance experts but include accounting finance expert, corporate sustainability disclosure, executive compensation and AC chair experience. **Model (4)** uses model 3 but include non-accounting finance expert and exclude corporate sustainability disclosure. **Model (5)** Uses model 4 but includes corporate sustainability disclosure and excludes executive compensation. **Model (6)** excludes both accounting finance and non-accounting finance experts but includes sustainability disclosure, executive compensation and AC chair experience. **Model (7)** uses model 6 but includes accounting finance experts and excludes executive compensation. **Model (8)** includes only accounting finance experts and corporate sustainability disclosure. **Model (9)** Includes all our latent constructs (accounting finance experts, non-accounting finance experts, corporate sustainability disclosure, and executive compensation and AC chair experience. See Table 1 for the definition of the variables. The HTMT criteria are reported in the Appendix.

Table 3. 15 HTMT -Discriminant Validity test results -During GFC

Table A2. Heterotrait - Monotrait (HTMT) results: discriminant validity tests for models (1) to (9). During financial crisis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Accounting Expert >Tobin's Q	0.326	-	0.252	0.276	0.117	-	0.130	-	0.116
	[0.000]	-	[0.014]	[0.019]	[0.107]	-	[0.095]	-	[0.109]
Accounting Expert > Z-score	0.230	-	0.243	0.245	0.230	-	0.228	-	0.130
	[0.018]	-	[0.016]	[0.013]	[0.016]	-	[0.019]	-	[0.106]
Non Accounting Expert >Tobin's Q	0.198	0.154	-	0.098	0.183	-	-	0.276	0.154
	[0.009]	[0.062]	-	[0.006]	[0.047]	-	-	[0.049]	[0.062]
Non Accounting Expert > Z-score	0.201	0.165	-	0.198	0.183	-	-	0.245	0.165
	[0.022]	[0.091]	-	[0.030]	[0.048]	-	-	[0.009]	[0.091]
Sustainability Disclosure >Tobin's Q	-	0.056	0.225	-	0.274	0.119	0.105	0.117	0.056
	-	[0.005]	[0.058]	-	[0.000]	[0.000]	[0.008]	[0.088]	[0.005]
Sustainability Disclosure >Z-Score	-	0.274	0.365	-	0.156	0.367	0.345	0.664	0.274
	-	[0.000]	[0.000]	-	[0.029]	[0.000]	[0.002]	[0.000]	[0.000]
Exec. Compensation >Tobin's Q	0.165	0.195	0.167	0.164	-	0.207	-	-	0.165
	[0.090]	[0.085]	[0.089]	[0.104]	-	[0.016]	-	-	[0.101]
Exec. Compensation >Z-score	0.068	0.073	0.095	0098	-	0.088	-	-	0.089
	[0.110]	[0.105]	[0.109]	[0.106]	-	[0.004]	-	-	[0.109]
AC Chair Experience > Tobin's Q	-	0.271	0.290	0.281	0.231	0.323	0.245	0.281	0.291
	-	[0.000]	[0.000]	[0.001]	[0.000]	[0.000]	[0.005]	[0.001]	[0.000]
AC Chair Experience > Z-score	-	0.331	0.269	0.307	0.231	0.245	0.223	0.207	0.331
	-	[0.000]	[0.019]	[0.062]	[0.040]	[0.035]	[0.054]	[0.082]	[0.000]
Liquidity > Z-score	0.660	0.481	0.324	0.218	0.381	0.347	0.332	0.218	0.281
	[0.000]	[0.000]	[0.002]	[0.019]	[0.000]	[0.000]	[0.000]	[0.019]	[0.025]
Profitability >Z-score	0.507	0.235	0.275	0.298	0.235	0.231	0.246	0.298	0.235
	[0.000]	[0.022]	[0.010]	[0.009]	[0.014]	[0.018]	[0.016]	[0.009]	[0.022]
Efficiency > Z-score	0.138	0.262	0.266	0.462	0.262	0.241	0.239	0.462	0.262
	[0.009]	[0.000]	[0.005]	[0.000]	[0.002]	[0.006]	[0.001]	[0.000]	[0.000]
Leverage > Z-score	0.337	0.231	0.275	0.266	0.301	0.339	0.337	0.266	0.231
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Z-score>Tobin's Q	0.666	0.661	0.652	0.785	0.671	0.597	0.650	0.785	0.661
Adjusted R²:	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Z-score									
Tobin's Q	0.575	0.576	0.589	0.489	0.587	0.304	0.276	0.590	0.566

Notes: This tables reports the HTMT criteria that measure the correlations among constructs or indicators. The figures in the brackets are the *p*-**values** showing the *statistical significance* of the correlations regarding their distance from the threshold. See Table 1 for the definition of the variables. See table 3.9 for definitions of indicators and constructs

Table 3. 16 HTMT discriminant validity test results -post GFC

Table A2. Heterotrait - Monotrait (HTMT) results: discriminant validity tests for models (1) to (9); post financial crisis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Accounting Expert >Tobin's Q	0.426	-	0.252	0.376	0.217	-	0.230	-	0.206
	[0.000]	-	[0.004]	[0.009]	[0.017]	-	[0.005]	-	[0.018]
Accounting Expert > Z-score	0.280	-	0.143	0.245	0.130	-	0.128	-	0.130
	[0.002]	-	[0.006]	[0.035]	[0.062]	-	[0.016]	-	[0.106]
Non Accounting Expert >Tobin's Q	0.248	0.254	-	0.198	0.183	-	-	0.276	0.154
	[0.002]	[0.062]	-	[0.006]	[0.047]	-	-	[0.049]	[0.062]
Non Accounting Expert > Z-score	0.201	0.265	-	0.138	0.183	-	-	0.245	0.165
	[0.002]	[0.001]	-	[0.000]	[0.003]	-	-	[0.035]	[0.001]
Sustainability Disclosure >Tobin's Q	-	0.256	0.225	-	0.274	0.319	0.205	0.217	0.256
	-	[0.005]	[0.058]	-	[0.000]	[0.000]	[0.009]	[0.008]	[0.005]
Sustainability Disclosure >Z-Score	-	0.374	0.165	-	0.156	0.367	0.345	0.664	0.274
	-	[0.000]	[0.000]	-	[0.029]	[0.000]	[0.012]	[0.000]	[0.000]
Exec. Compensation >Tobin's Q	0.095	0.93	0.089	0.084	-	0.082	-	-	0.095
	[0.015]	[0.017]	[0.019]	[0.019]	-	[0.020]	-	-	[0.016]
Exec. Compensation >Z-score	0.068	0.073	0.225	0.598	-	0.178	-	-	0.083
	[0.048]	[0.105]	[0.000]	[0.000]	-	[0.004]	-	-	[0.105]
AC Chair Experience > Tobin's Q	-	0.335	0.340	0.311	0.331	0.323	0.345	0.311	0.331
	-	[0.000]	[0.000]	[0.001]	[0.000]	[0.001]	[0.000]	[0.003]	[0.000]
AC Chair Experience > Z-score	-	0.331	0.369	0.207	0.331	0.345	0.283	0.217	0.231
	-	[0.000]	[0.019]	[0.062]	[0.014]	[0.002]	[0.024]	[0.062]	[0.000]
Liquidity > Z-score	0650	0.281	0.324	0.218	0.381	0.347	0.332	0.218	0.281
	[0.000]	[0.005]	[0.002]	[0.049]	[0.033]	[0.000]	[0.000]	[0.049]	[0.025]
Profitability >Z-score	0.507	0.135	0.175	0.298	0.135	0.131	0.146	0.298	0.135
	[0.000]	[0.022]	[0.000]	[0.000]	[0.014]	[0.000]	[0.006]	[0.000]	[0.022]
Efficiency > Z-score	0.238	0.252	0.276	0.462	0.272	0.251	0.299	0.472	0.292
	[0.009]	[0.000]	[0.005]	[0.000]	[0.002]	[0.006]	[0.001]	[0.000]	[0.000]
Leverage > Z-score	0.357	0.261	0.285	0.276	0.331	0.349	0.357	0.276	0.271
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Z-score>Tobin's Q	0.862	0.868	0.643	0.848	0.699	0.630	0.650	0.929	0.866
Adjusted R²:	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Z-score									
Tobin's Q	0.601	0.593	0.520	0.472	0.567	0.359	0.381	0.583	0.626

Notes: This tables reports the HTMT criteria that measure the correlations among constructs or indicators. The figures in the brackets are the *p-values* showing the *statistical significance* of the correlations regarding their distance from the threshold. See Table 1 for the definition of the variables. See table 3.9 for definitions of indicators and constructs

Similar to my previous chapter, I provide PLS-SEM results of some of my key findings in figure 3.16 to 3.19

Which include my model 1, 3, 4 and 5

$$Tobin's Q_{it} = \alpha_{it} \beta_1 ACFE + \beta_2 NACFE_{it} + \beta_4 EXECOMP_{it} + \beta_5 CHIREXP_{it} + \beta_6 \ Profitability \ ratio_{it} + \beta_7 \ Efficiency \ ratio_{it} + \beta_8 \ Leverage_{it} + \beta_9 \ Liquidity \ ratio_{it} + \varepsilon_{it}$$
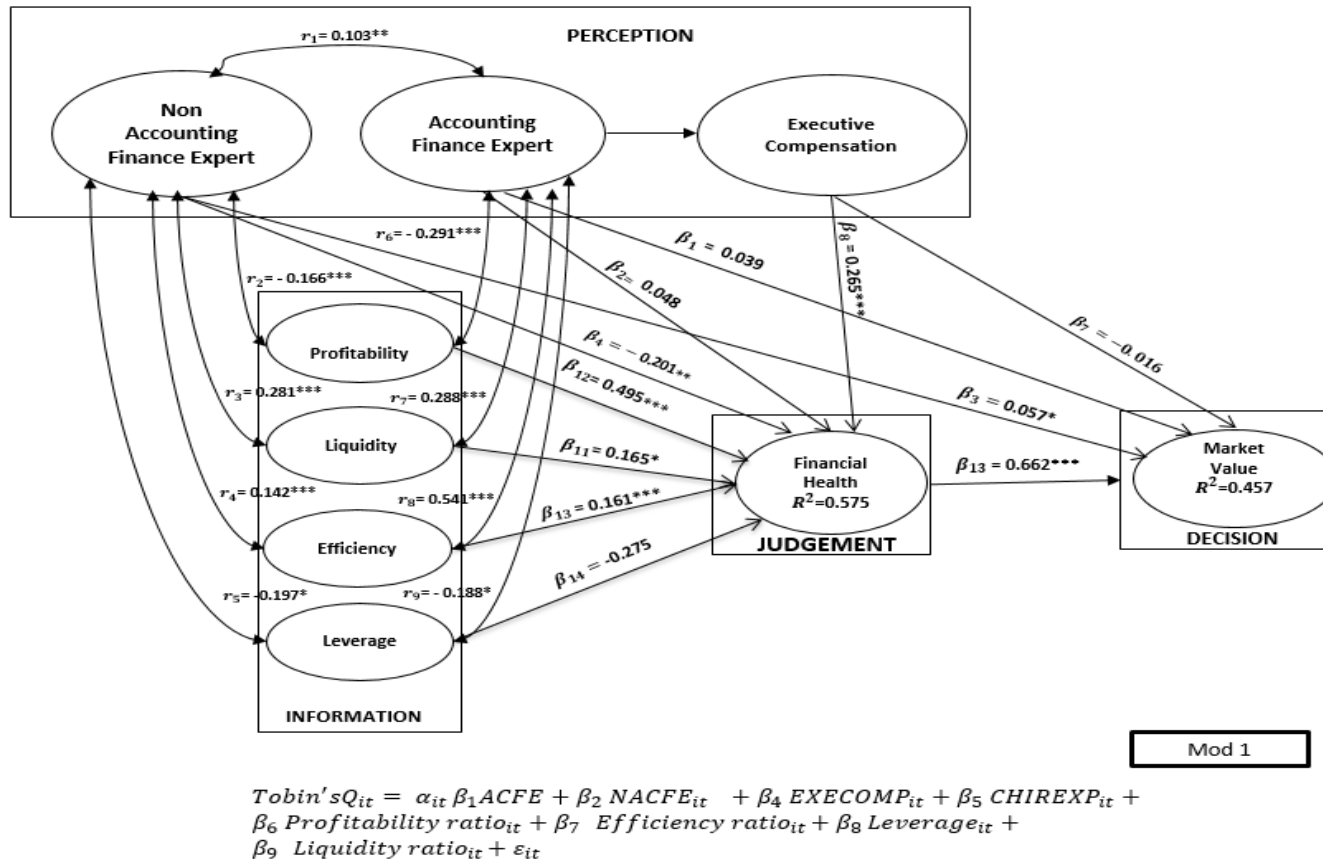
Figure 3. 16 PLS-SEM results on effect of ACFE and NACFE on firm outcomes during GFC
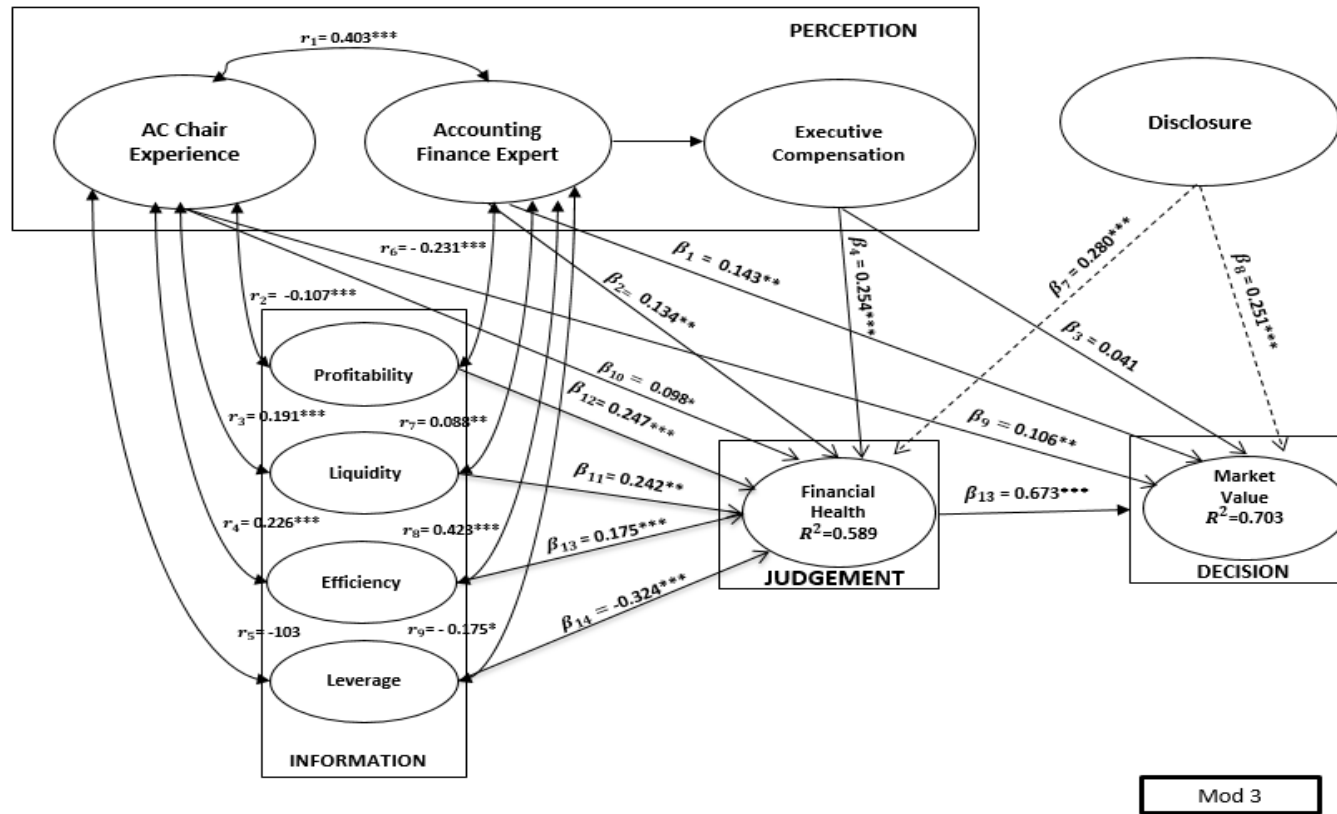
$Tobin's Q_{it} + \beta_1\ ACFE_{it}\ \ + \beta_2\ DISCLOSURE_{it} + \beta_3\ EXECOMP_{it} +$
$\beta_4\ CHIREXP_{it} + \beta_5\ Profitability\ ratio_{it} + \beta_6\ \ Efficiency\ ratio_{it} +$
$\beta_7\ Leverage_{it} + \beta_8\ \ Liquidity\ ratio_{it} + \varepsilon_{it}$

Figure 3. 17 Effect of ACFE, AC chair and CSD on firm's outcomes during GFC

Figure 3. 18 PLS-SEM results on effects of Finance experts with no CSD on firm outcomes during GFC

The figure contains the following labeled relationships:

PERCEPTION box contains: AC Chair Experience, Accounting Finance Expert, Non Accounting Expert

$r_1 = 0.403***$ (AC Chair Experience ↔ Accounting Finance Expert)

$r_1 = 0.103**$ (Accounting Finance Expert ↔ Non Accounting Expert)

Executive Compensation

$r_6 = -0.231***$

$r_2 = -0.107***$

$\beta_1 = 0.067$

$\beta_2 = 0.122*$

$\beta_4 = 0.195**$

$\beta_7 = 0.156**$

$\beta_3 = 0.095*$

$\beta_8 = 0.032$

$r_3 = 0.191***$

$r_7 = 0.088**$

$\beta_{10} = 0.065$

$\beta_{12} = 0.247***$

$\beta_9 = 0.087$

INFORMATION box contains: Profitability, Liquidity, Efficiency, Leverage

$r_4 = 0.226***$

$r_8 = 0.423***$

$\beta_{11} = 0.117*$

Financial Health $R^2 = 0.489$

Market Value $R^2 = 0.697$

$\beta_{13} = 0.673***$

$r_5 = -103$

$r_9 = -0.175*$

$\beta_{13} = 0.175**$

$\beta_{14} = -0.324***$

JUDGEMENT

DECISION

Mod 4

$$Tobin'sQ_{it} = \alpha_{it} + \beta_1 ACFE + \beta_2 NACFE_{it} + \beta_3 CHIREXP_{it} +$$
$$\beta_4 COMPENSATION_{it} + \beta_5 Profitability\ ratio_{it} + \beta_6\ Efficiency\ ratio_{it} +$$
$$\beta_7 Leverage_{it} + \beta_8\ Liquidity\ ratio_{it} + \varepsilon_{it}$$

Figure 3. 18 PLS-SEM results on effects of Finance experts with no CSD on firm outcomes during GFC

$$Tobin'sQ_{it} = \alpha_{it} + \beta_1 \, ACFE + \beta_2 \, NACFE_{it} + \beta_3 \, DISCLOSURE_{it} + \beta_4 \, CHIREXP_{it} + \beta_5 \, Profitability \, ratio_{it} + \beta_6 \, Efficiency \, ratio_{it} + \beta_7 \, Leverage_{it} + \beta_8 \, Liquidity \, ratio_{it} + \varepsilon_{it}$$
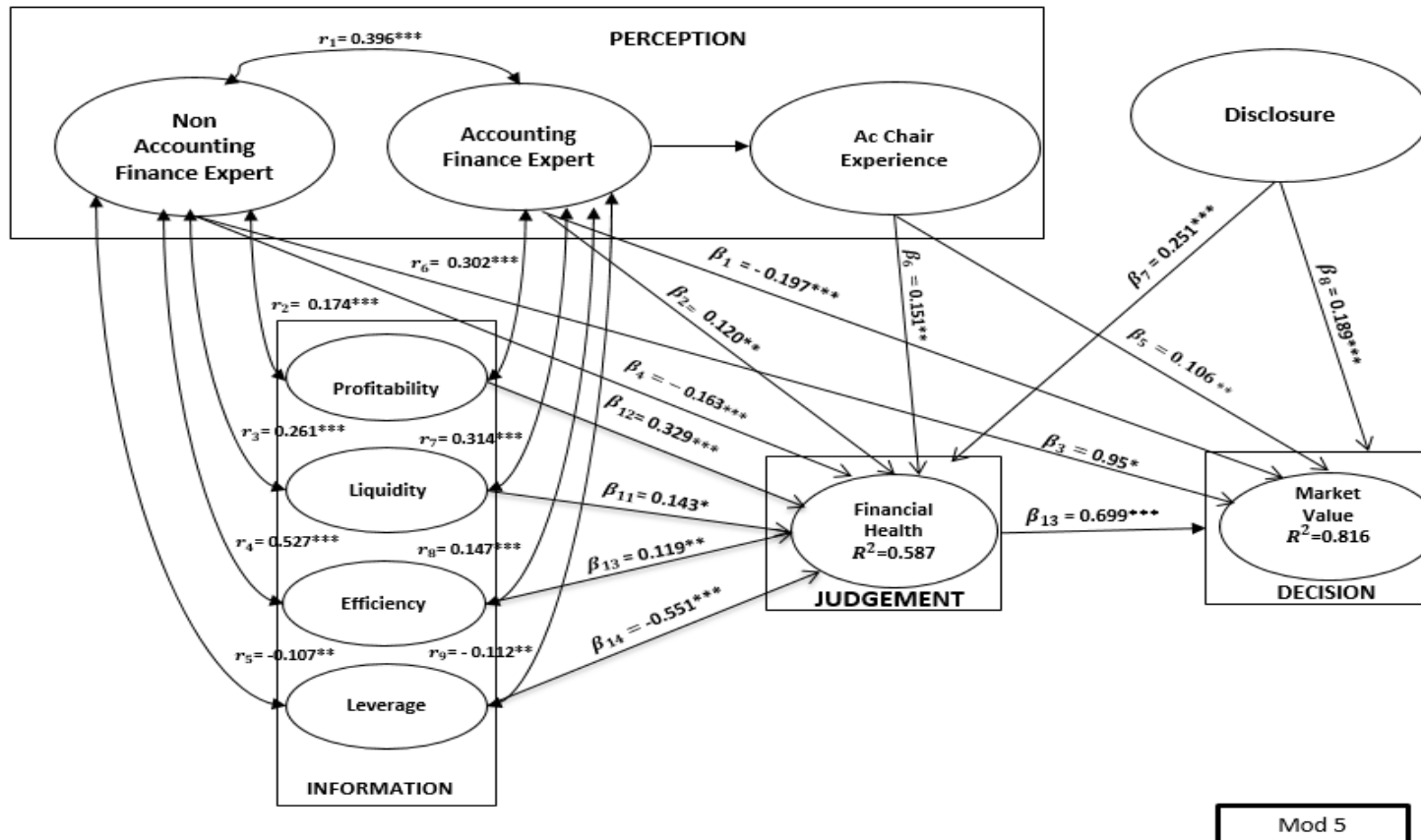
Figure 3. 19 PLS-SEM results on Finance experts, AC chair experience and CSD during GFC

In Figure 3.20, 3.21 and 3.22, I examine the impact of changes in corporate financial performance and market value on current CSD, executive compensation and composition of AC. I repeat similar for my results during stable periods to identify key concerns/issues
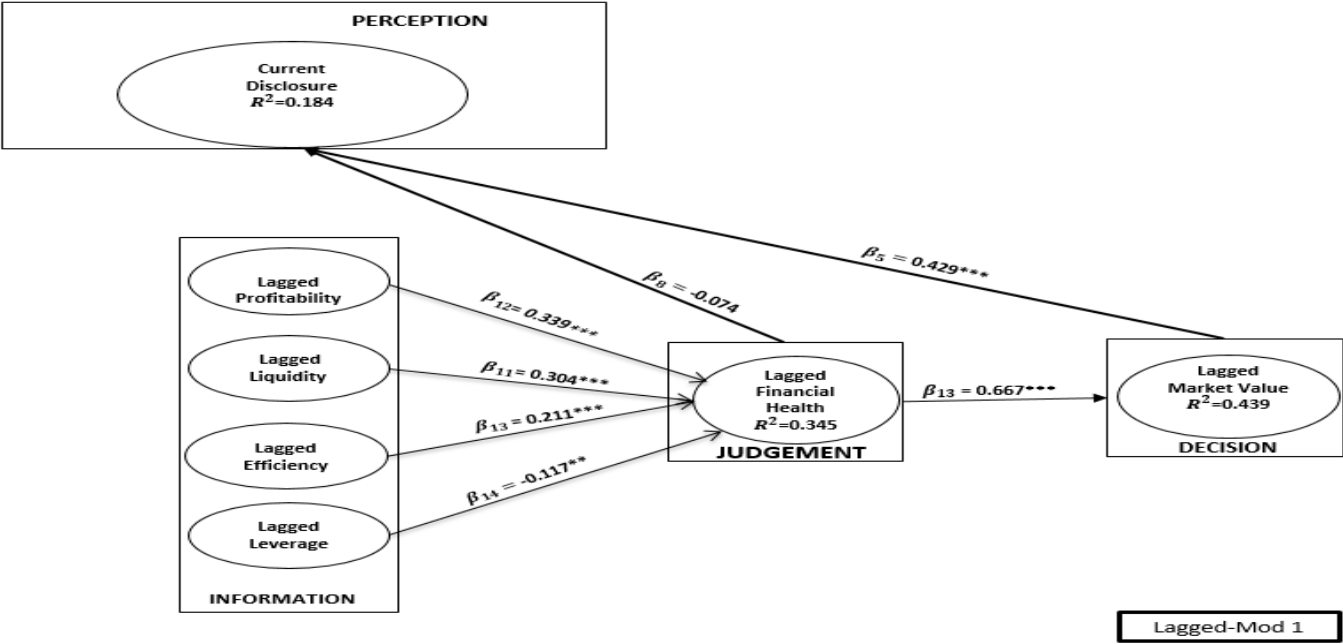
$$Current\ Disclosure_{it} = \alpha_{it} + \beta_1\ lagged Tobin's Q + \beta_5\ Profitability\ ratio_{it} + \beta_6\ Efficiency\ ratio_{it} + \beta_7\ Leverage_{it} + \beta_8\ Liquidity\ ratio_{it} + \varepsilon_{it}$$

Figure 3. 20 PLS-SEM results on lagged effect of firm outcomes on current CSD
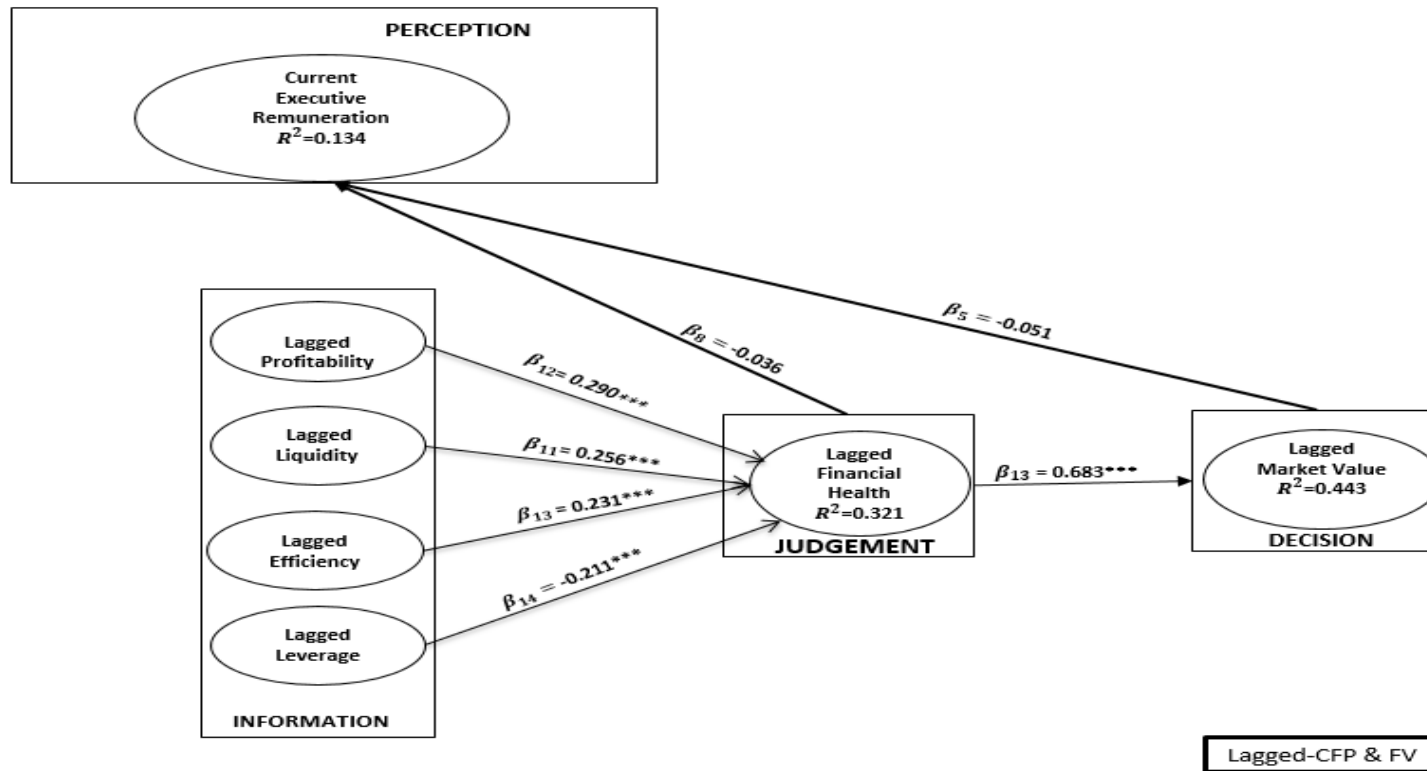
$$Executive\ Compensation_{it} = \alpha_{it} + \beta_1\ laggedTobin'sQ + \beta_5\ Profitability\ ratio_{it} +$$
$$\beta_6\ Efficiency\ ratio_{it} + \beta_7\ Leverage_{it} + \beta_8\ \ Liquidity\ ratio_{it} + \varepsilon_{it}$$

Figure 3. 21 PLS-SEM results on lagged effect of Firm's outcomes on current executive compensation during GFC
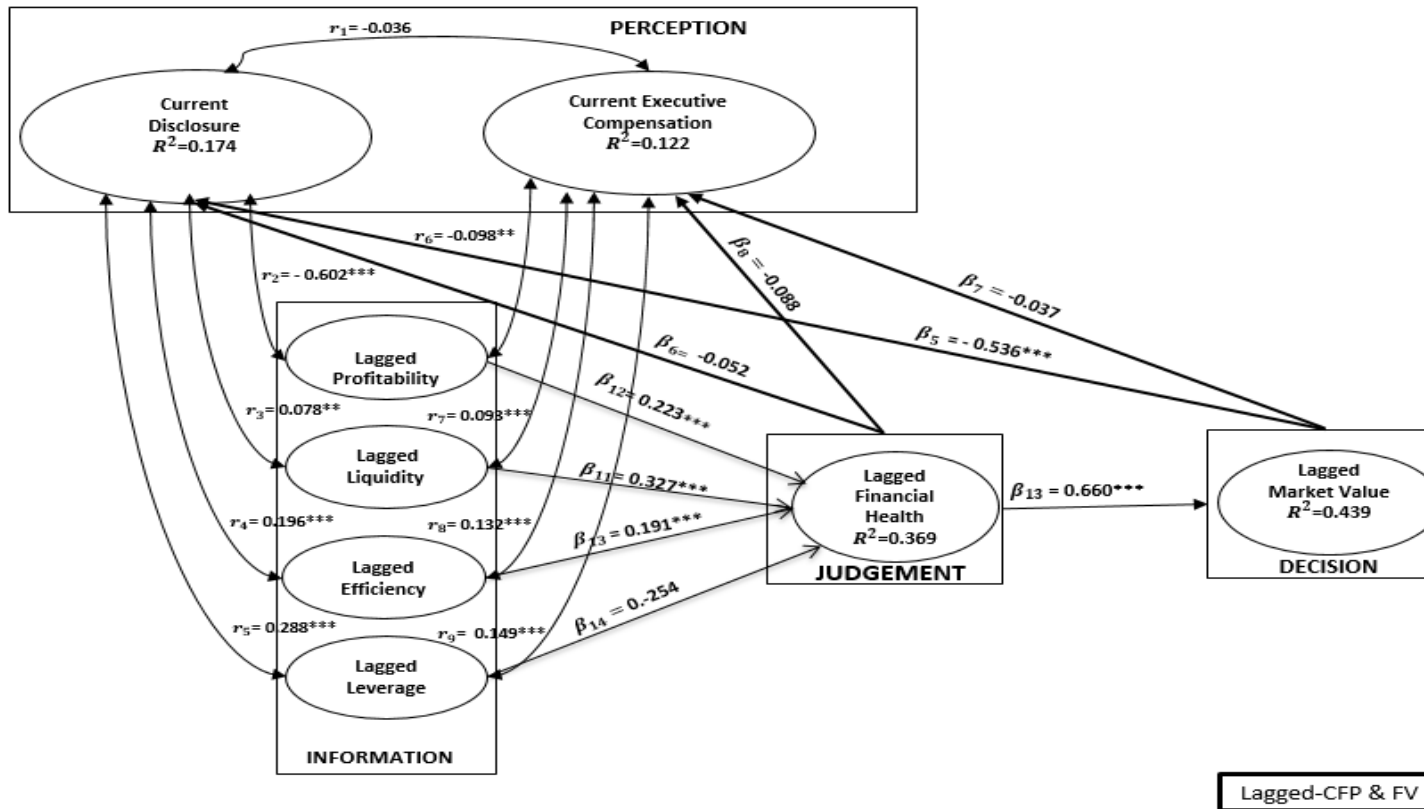
Figure 3. 22 PLS-SEM results of lagged Firms outcomes on current CSD and Executive compensation -during GFC
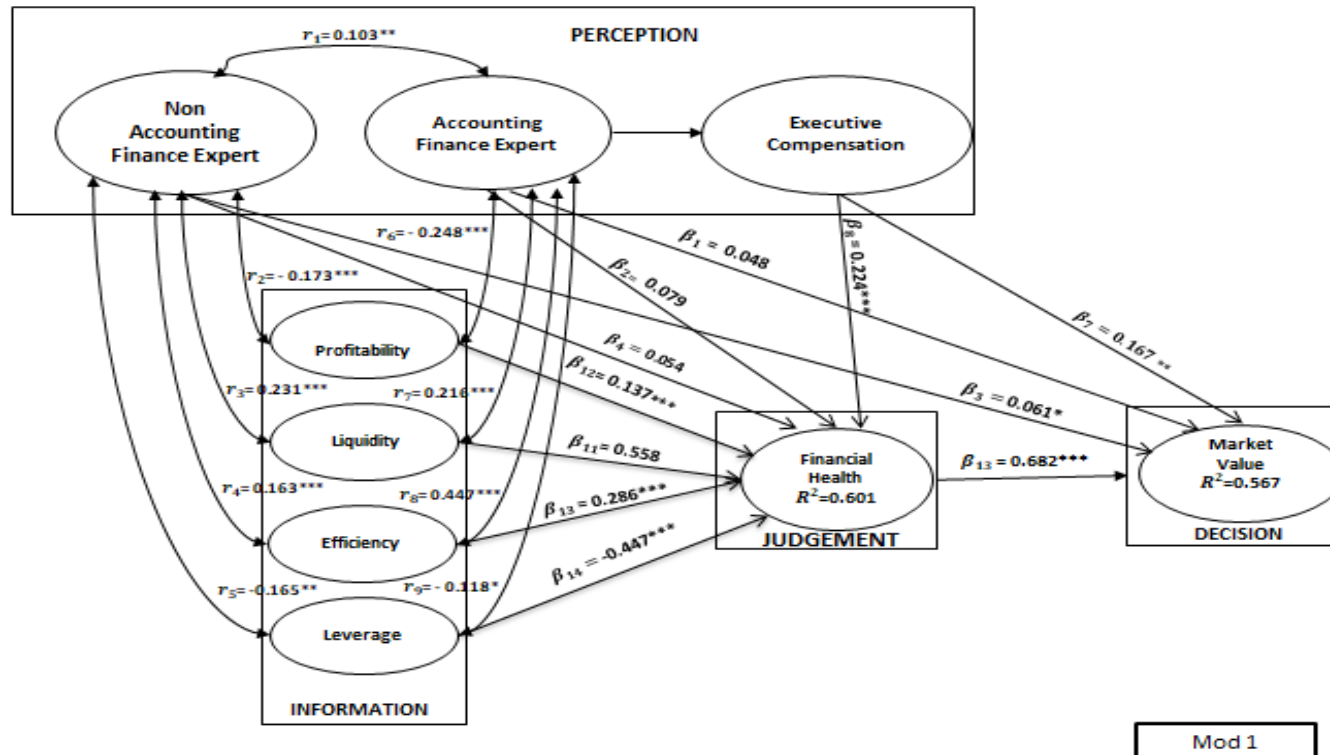
$Executive\ Compensation_{it} + Disclosure = \alpha_{it} + \beta_1\ laggedTobin'sQ +$
$\beta_5\ Profitability\ ratio_{it} + \beta_6\ Efficiency\ ratio_{it} + \beta_7\ Leverage_{it} + \beta_8\ Liquidity\ ratio_{it} + \varepsilon_{it}$

Figure 3. 23 PLS-SEM results on effects of ACFE and NACFE on outcomes-Post GFC
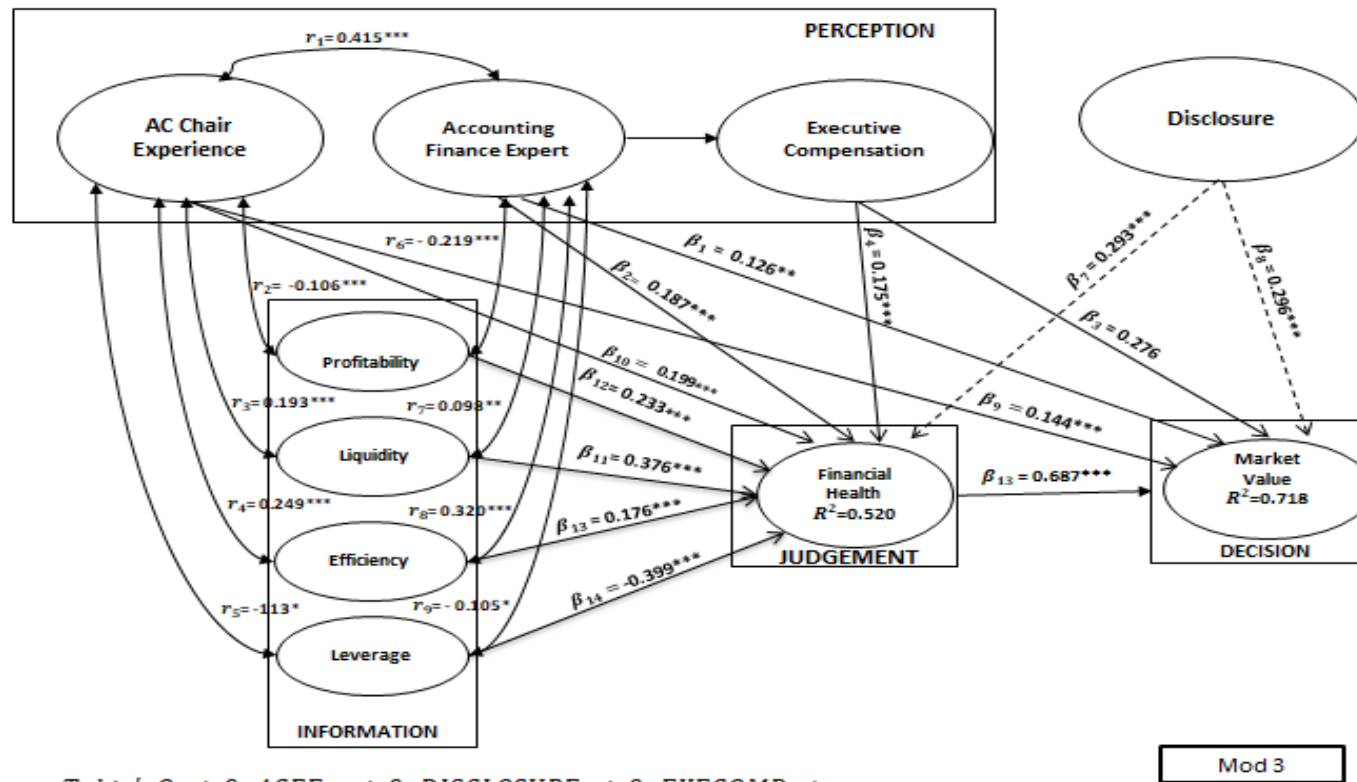
$$Tobin's Q_{it} = \alpha_{it} \beta_1 ACFE + \beta_2 NACFE_{it} + \beta_4 EXECOMP_{it} + \beta_5 CHIREXP_{it} + \beta_6 Profitability \, ratio_{it} + \beta_7 \, Efficiency \, ratio_{it} + \beta_8 \, Leverage_{it} + \beta_9 \, Liquidity \, ratio_{it} + \varepsilon_{it}$$

$Tobin's Q_{it} + \beta_1\ ACFE_{it} + \beta_2\ DISCLOSURE_{it} + \beta_3\ EXECOMP_{it} + \beta_4\ CHIREXP_{it} + \beta_5\ Profitability\ ratio_{it} + \beta_6\ Efficiency\ ratio_{it} + \beta_7\ Leverage_{it} + \beta_8\ Liquidity\ ratio_{it} + \varepsilon_{it}$

Figure 3. 24 PLS-SEM results on effects of ACFE and NACFE and CSD on outcomes -post GFC
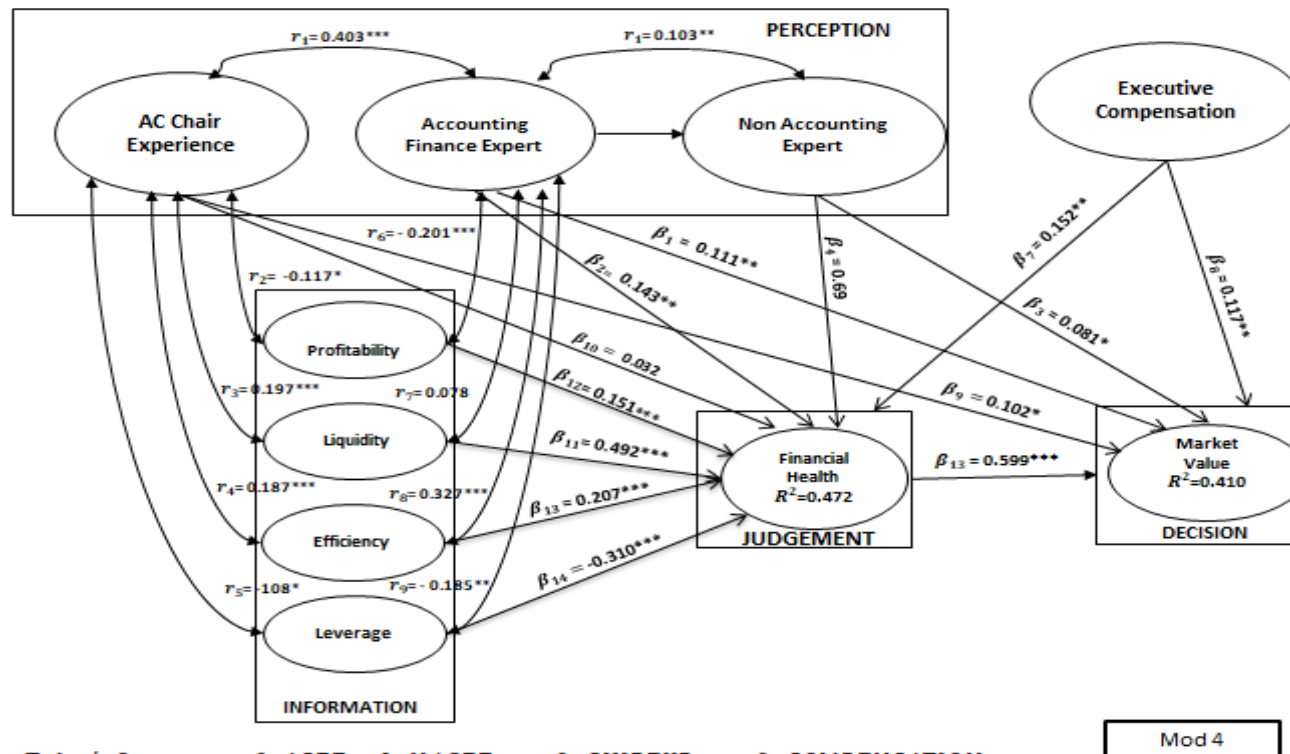
Figure 3. 25 PLS-SEM results on effects of finance experts and AC chair Experience on outcomes - post GFC
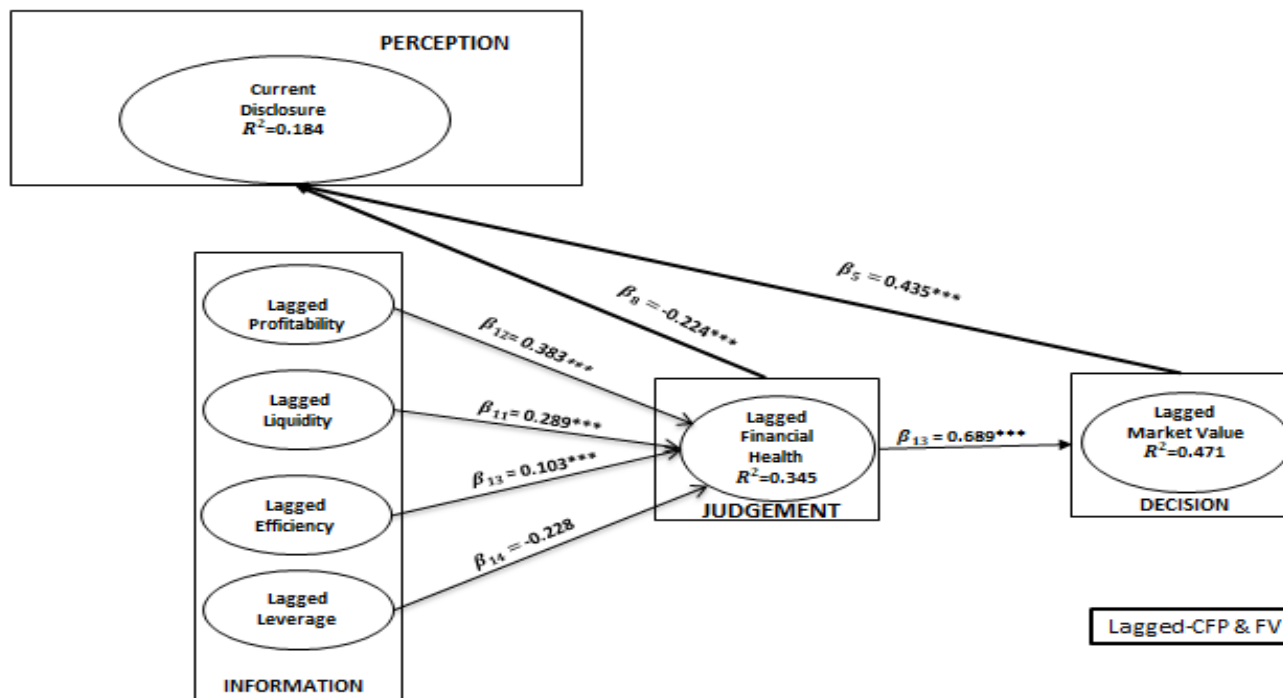
$$Current\ Disclosure_{it} = \alpha_{it} + \beta_1\ laggedTobin'sQ + \beta_5\ Profitability\ ratio_{it} + \beta_6\ Efficiency\ ratio_{it} + \beta_7\ Leverage_{it} + \beta_8\ Liquidity\ ratio_{it} + \varepsilon_{it}$$

Figure 3. 26 PLS-SEM results of lagged firm outcomes on current CSD
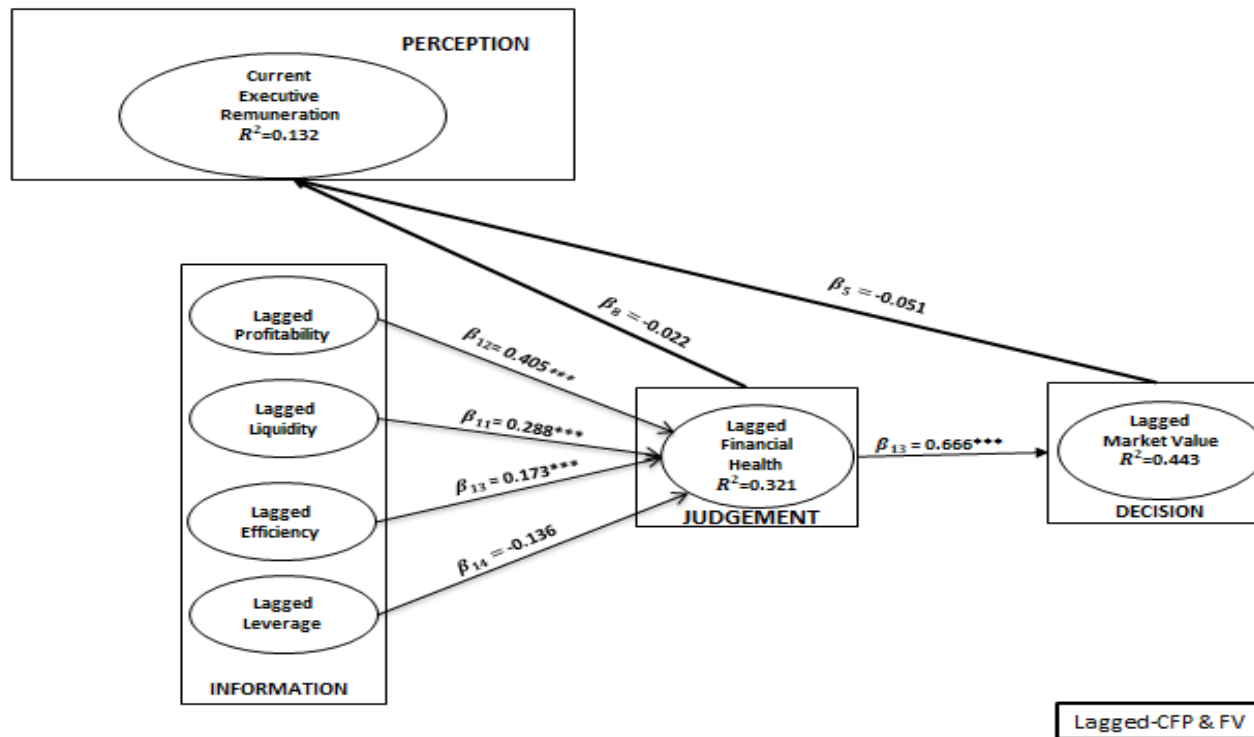
Figure 3. 27 PLS-SEM results of lagged firm's outcomes on current executive compensation -post GFC

$$Executive\ Compensation_{it} = \alpha_{it} + \beta_1\ lagged Tobin's\ Q + \beta_5\ Profitability\ ratio_{it} + \beta_6\ Efficiency\ ratio_{it} + \beta_7\ Leverage_{it} + \beta_8\ Liquidity\ ratio_{it} + \varepsilon_{it}$$

Figure 3. 28 PLS-SEM results on effects of lagged firm's outcomes on current CSD and executive compensation

The figure contains the following labeled elements:

PERCEPTION

- Current Disclosure $R^2=0.142$
- Current Remuneration $R^2=0.122$
- $r_1=-0.036$

INFORMATION

- Lagged Profitability
- Lagged Liquidity
- Lagged Efficiency
- Lagged Leverage

JUDGEMENT

- Lagged Financial Health $R^2=0.369$

DECISION

- Lagged Market Value $R^2=0.439$

Lagged-CFP & FV

Path coefficients:
- $r_2=-0.602$***
- $r_3=0.078$**
- $r_4=0.196$***
- $r_5=0.288$***
- $r_6=-0.098$**
- $r_7=0.093$***
- $r_8=0.132$***
- $r_9=0.149$***
- $\beta_5=-0.432$***
- $\beta_6=-0.188$
- $\beta_7=-0.067$
- $\beta_8=-0.027$
- $\beta_{11}=0.245$***
- $\beta_{12}=0.422$***
- $\beta_{13}=0.663$***
- $\beta_{13}=0.129$***
- $\beta_{14}=0.-244$

$$Executive\ Compensation_{it} + Disclosure =$$
$$\alpha_{it} + \beta_1\ laggedTobin'sQ + \beta_5\ Profitability\ ratio_{it} + \beta_6\ Efficiency\ ratio_{it} + \beta_7\ Leverage_{it} + \beta_8\ Liquidity\ ratio_{it} + \varepsilon_{it}$$

Figure 3. 28 PLS-SEM results on effects of lagged firm's outcomes on current CSD and executive compensation

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3.24 Analysis of the results during periods of GFC

Table 3.13 and 3.14 reports the PLS-SEM results for my throughput model during a period of economic uncertainty. The agency theory implies that during period of economic uncertainty both managers and investors tend to be more risk averse (Eisenhardt, 1989). Further, investors may require more than accounting information to make investment decisions during periods of economic uncertainty. They may require information such as the sustainability of the firm and the expertise level of the audit committee members.

In **model (1)** I show the effect of the combination of financial experts and executive compensation on financial health and firm value. My results indicate that independent accounting experts *(ACFE)* contribute positively to the financial health during periods of economic uncertainty ($\beta = 0.039$, $p = 0.465$) as well as positively to market value during periods of economic uncertainty ($\beta = 0.048$, $p = 0.398$). This result is consistent with prior studies that posit that during period of economic uncertainties firms rely on the expertise and experience of accounting finance experts for strategy formulation (Alderman, 2012). Similarly, my results show a positive association between non-accounting finance experts and firm value ($\beta = 0.057$, $p = 0.308$). However, there was a negative association between non-accounting finance experts and financial health ($\beta = -0.201$, $p = 0.012$). My results imply that the positive association between accounting certified financial experts and firm value is higher during periods of economic instability compared to during stable times. Therefore, I refuse to reject my hypothesis *H2b*. Further, my results show a negative association between executive compensation and firm value ($\beta = -0.016$, $p = 0.654$). This result implies that during periods of economic uncertainty, investors lose trust in management and are unwilling to provide higher compensation for their efforts. In contrast, my results show a significant positive association between executive

compensation and financial health ($\beta = 0.265$, $p = 0.615$). This implies that firms that perform well during periods of economic uncertainty are still prepared to provide higher compensation and incentives to their directors in order not to lose them to their competitors (Fahlenbrach & Stulz, 2011). My results from model (1) show that there is a positive association between the financial health of companies and their firm value during periods of economic uncertainty ($\beta = 0.662$, $p = 0.000$). In other words, companies with sound financial health during periods of economic uncertainty are those with a higher market value. Further, companies with better financial health are those with a higher profitability ($\beta = 0.495$, $p = 0.000$), higher liquidity ($\beta = 0.165$, $p = 0.051$), are efficient in their operations ($\beta = 0.161$, $p = 0.049$), and have a lower leverage ($\beta = -0.275$, $p = 0.009$).

In **model (2)** I exclude accounting finance experts but include audit committee chair and sustainability disclosure to ascertain the effects on financial health and firm value. My results shows that, unlike model (1), there is a less significant association between non-accounting financial experts and firm value. The inclusion of corporate sustainability disclosure and audit committee chair in model (2) displays a very significant positive association between non-accounting financial experts and firm value, even in the absence of accounting financial experts ($\beta = 0.108$, $p = 0.098$). Further, my results *the positive association between audit committee chair experience and firm value is higher during periods of economic instability compared to during stable times* ($\beta = 0.107$, $p = 0.099$; $\beta = 0.058$, $p = 0.149$). I refused to reject my hypothesis *H4d* as a result of my findings from model 2. Also, this is consistent with previous studies that posit that firms rely on experts during periods of uncertainty (Alderman 2012). Similar to the results in model (1), I observe a positive association between the financial health of companies and their firm value during periods of economic uncertainty ($\beta = 0.866$, $p = 0.000$). Thus, companies with better financial health are those with a higher profitability ($\beta = 0.501$, $p = 0.000$),

higher liquidity ($\beta = 0.175$, $p = 0.053$), are efficient in their operations ($\beta = 0.164$, $p = 0.058$) and have a lower leverage ($\beta = -0.286$, $p = 0.010$).

In model (3) I consider accounting finance experts and audit committee chair experience in addition to corporate sustainability disclosure but exclude non-accounting finance expert. Regarding accounting finance experts, I found a significant positive association between accounting finance experts and firm value ($\beta = 0.143$, $p = 0.057$). Further, I determined a significant positive association between accounting finance experts and financial health when sustainability disclosure is higher ($\beta = 0.134$, $p = 0.058$). It should be noted that these effects are stronger when compared to the results in models (1) and (2). My result from model 3 shows that the positive association between corporate sustainability disclosure and firm value or financial health is higher during both periods of economic instability and stable times. I therefore reject my hypothesis 5a and 5b. Further, I observe a significant improvement in the financial health of firms ($\beta = 0.875$, $p = 0.000$) and a higher coefficient of determination of ($R^2 = 0.703$) in comparison to model (1) ($R^2 = 0.467$) and model (2) ($R^2 = 0.588$). These stronger effects could be attributed to the inclusion of corporate sustainability disclosure together with audit committee chair experience. My results in model 3 implies that, investors and market observers require transparency and sustainability assurance during periods of economic uncertainties.

In **model (4)** I exclude corporate sustainability disclosure but include audit committee chair and executive compensation to ascertain the effects on corporate financial performance (financial health) and firm value. My results show an insignificant positive association between both accounting finance experts and non-accounting finance experts and firm value ($\beta = 0.067$, $p = 0.122$; $\beta = 0.95$, $p = 0.103$), respectively. Further, I observe a less significant positive association between AC chair and firm value ($\beta = 0.087$, $p = 0.117$). This results implies that the AC chair is less influential in firms with no corporate sustainability disclosure practices. Also, my results show a positive association between executive compensation and firm value ($\beta = 0.156$, $p = 0.054$). Similar to the results in model (2) and model (3), I found a positive association between audit committee chair and firm value ($\beta = 0.087$, $p = 0.107$). This result implies that in periods of uncertainty, firms have to pay higher compensation to maintain their most experienced directors. My results relating to executive compensation are consistent with the theories of the knowledge-based view (KBV) and resource-based view (RBV), which posit that in period of uncertainty firms rely on the valuable, rare and unique resources (experienced finance experts) on their board to achieve a competitive advantage .

In **model (5)** I further examine the effect of corporate sustainability disclosure without including executive compensation in my model. I observe a significant positive association between both accounting finance experts and non-accounting finance experts on firm value ($\beta = 0.197$, $p = 0.017$; $\beta = 0.095$, $p = 0.097$), respectively. Further, my results show a positive association between audit committee chair and firm value ($\beta = 0.106$, $p = 0.101$). In addition, I observe a significant positive association between CSD and firm value ($\beta = 0.189$, $p = 0.018$), and CSD and financial health ($\beta = 0.251$, $p = 0.009$). This result confirms implies that corporate sustainability disclosure communicates trust

to investors and market observers during periods of economic uncertainty. Thus, investor's prioritise information about corporate sustainability over information about executive compensation during periods of economic uncertainty.

In **model (6)** I exclude accounting finance experts and non-accounting finance experts to further examine the effect of the combination of corporate sustainability disclosure and audit committee chair on financial health and firm value. My results show a positive association between corporate sustainability disclosure and firm value ($\beta = 0.242$, $p < 0.009$). My results in model 6 confirms implies that the positive association between corporate sustainability disclosure and firm value is higher during both periods of economic instability and stable times ($\beta = 0.106$, $p < 0.101$), therefore I reject my hypothesis *5b*. Moreover, I determine a positive association between audit committee chair experience and firm value ($\beta = 0.078$, $p < 0.102$). These results are consistent with hypothesis 4c that posit that the positive association between audit committee chair experience and financial health is higher during periods of economic instability compared to during stable times. In accordance with my results from model 6, I refused to reject my hypothesis 4b and 4c.

In **model (7)** I combine accounting finance experts and AC chair experience with corporate sustainability disclosure and exclude executive compensation. My results show a stronger association between accounting finance experts and financial health ($\beta = 0.107$, $p < 0.095$). Further, I observe a stronger association between accounting financial experts and firm value ($\beta = 0.098$, $p < 0.100$). My result for corporate sustainability disclosure also shows a significant positive association with both financial health ($\beta = 0.114$, $p < 0.051$) and firm value, respectively ($\beta = 0.213$, $p < 0.010$). Further, I observe a significant positive association between AC chair experience and financial health. These findings are in line with the resource-based view (RBV) and the knowledge-based view (KBV), which

posit that firms rely on their unique resources (human capital) to achieve a competitive advantage, especially during periods of financial uncertainty. I refused to reject hypothesis 5b that state that the positive association between corporate sustainability disclosure and firm value is higher during periods of economic instability compared to during stable times because I observed a significant association between CSD and firm value during both periods of uncertainties and stability.

In **model (8)** I exclude accounting finance experts and AC chair experience but included corporate sustainability disclosure (CSD) to further examine the strength of CSD. I observe that even in the absence of an accounting finance expert and AC chair experience, a combination of non-accounting finance experts and corporate sustainability disclosure can provide strong results. My result shows a strong and positive association between non-accounting finance experts and financial health ($\beta = 0.163$, $p < 0.035$) when CSD is combined with non-accounting finance experts compared to the results in model (1), which show a significant negative association between non-accounting finance experts and financial health ($\beta = -0.201$, $p < 0.012$) when CSD is excluded. Further, I observe a significant positive association between financial health and firm value ($\beta = 0.629$, $p < 0.000$).

In **model (9)** I combine the entire latent construct in my models to examine their overall effect on financial health and firm value. I observe a significant positive association between accounting finance experts and firm value ($\beta = 0.143$, $p < 0.051$), a significant positive association between non-accounting finance experts and firm value ($\beta = 0.128$, $p < 0.056$), and a significant positive association between AC chair and firm value ($\beta = 0.106$, $p < 0.094$). My results show that in periods of economic uncertainty, the

combination of accounting financial experts, non-accounting financial experts, AC chair experience and high CSD can secure a better outcomes.

Models (1) and **(2)** of figure 36 and 37 examine the lag effects of firm value and financial health on current corporate sustainability disclosure and executive remuneration. My results in models (1) to (3) show that lagged Tobin's Q ($\beta = 0.536$, $p < 0.000$; ($\beta = 0.426$, $p < 0.000$) has a significant positive association with the current corporate sustainability disclosure in model (3) (R^2=0.439). This result implies that TMT prioritise market perception in their decision making regarding CSD. This result is consistent with the stakeholder theory, which implies that good corporate governance prioritises investor perception about firm sustainability disclosure. However, I observe that in model (1) and model (2), a lagged Z-score ($\beta = -0.052$, $p < 0.250$; ($\beta = -0.074$, $p < 0.154$) has an insignificant negative association with corporate sustainability disclosure. Further, my results in models (1) to (2) show that a lagged *Z-score* ($\beta = -0.088$, $p < 0.111$; $\beta = -0.036$, $p < 0.271$) has an insignificant negative association with current executive compensation. I observe in models (1) to (3) that there is a significant positive association between a lagged Z-score and Tobin's Q ($\beta = 0.660$, $p < 0.000$; $\beta = 0.683$, $p < 0.000$; $\beta = 0.667$, $p < 0.000$).

Table 3.13 reports the PLS-SEM results for my throughput model after the 2008/9 financial crisis period. I observe that both accounting finance experts and non-accounting finance experts contribute positively towards financial health and firm value in all models (1) to (9) post financial crisis. Therefore, I reject my hypothesis 3b that posit that the positive association between non-accounting certified financial experts and firm value is higher during periods of economic instability compared to during stable times. My results

rather shows a significant positive association between the non-accounting finance experts and firm value post crisis times rather than instability periods.

Thus, my results in model (1) during the period of financial crisis show a negative association ($\beta = -0.201$, $p < 0.012$) between non-accounting finance experts and financial health when I exclude corporate sustainability disclosure. However, I observe a positive association ($\beta = 0.052$, $p < 0.012$) between non-accounting financial experts and financial health in the same model post financial crisis. These results imply that both the SOX and the UK Corporate Governance Code 2016 provisions for increasing the number of independent accounting finance experts on the AC is paying some dividends.

In **model (2)** post crisis periods, I exclude accounting finance experts but include audit committee chair and sustainability disclosure into the model to ascertain the effects on financial health and firm value. I observed that, the inclusion of corporate sustainability disclosure and audit committee chair in model (2) showed a much more significant positive association between non-accounting financial experts and firm value, even in the absence of accounting financial experts ($\beta = 0.155$, $p = 0.052$). My results in model 2 implies that there is a positive association between corporate sustainability disclosure and firm value post periods of economic stability. In accordance with my results from model 2 post crisis times I reject hypothesis 5b and 5c.

Further, I observed a positive association between audit committee chair and firm value ($\beta = 0.199$, $p = 0.049$). This result is consistent with previous studies showing that corporate sustainability disclosure is very important to investors during periods of economic uncertainty (Alderman 2012). Similar to the results in model (1), I observe a positive association between the financial health of companies and their firm value during periods of economic uncertainty ($\beta = 0.676$, $p = 0.000$). Thus, companies with better financial health are those with a higher profitability ($\beta = 0.155$, $p = 0.053$), higher liquidity

($\beta = 0.175$, $p = 0.053$), are efficient in their operations ($\beta = 0.586$, $p = 0.000$) and have a lower leverage ($\beta = -0.469$, $p = 0.002$)

In **model (3)** post crisis periods, I consider accounting finance experts and audit committee chair experience in addition to corporate sustainability disclosure but exclude non-accounting finance experts. Regarding accounting finance experts, I determine a significant positive association between accounting finance experts and firm value ($\beta = 0.126$, $p = 0.059$). Further, I find a significant positive association between accounting finance experts and financial health ($\beta = 0.187$, $p = 0.018$). It should be noted that these effects are stronger compared to the results in models (1) and (2). Further, I observe a significant improvement in the financial health of firms ($\beta = 0.787$, $p = 0.000$) and a higher coefficient of determination of ($R^2 = 0.718$) in comparison to model (1) ($R^2 = 0.682$) and model (2) ($R^2 = 0.6$). These stronger effects could be attributed to the inclusion of corporate sustainability disclosure together with audit committee chair experience. These results are inconsistent with my hypothesis 5b that state that the positive association between corporate sustainability disclosure and firm value is higher during periods of economic instability compared to during stable times.

In **model (4)** post crisis periods, I exclude corporate sustainability disclosure but include audit committee chair and executive compensation to ascertain the effects on corporate financial performance (financial health) and firm value. My results show an insignificant positive association between accounting finance experts and firm value ($\beta = 0.031$, $p = 0.309$). Further, I observe an insignificant positive association between non-accounting finance experts and financial health. These results imply that both investors and market rely more on corporate sustainability for their investment decisions post financial crisis. Moreover, I observe a positive but less significant association ($\beta = 0.032$, $p = 0.459$)

between AC chair experience and financial health. These results imply that AC chair is less influential in firms with no corporate sustainability disclosure practices. Further, my results show a positive association between executive compensation and firm value (β = 0.117, p = 0.097). In accordance with the findings from my hypothesis 4 I reject my hypothesis 6b that state that the positive association between the value of executive compensation and firm value is higher during periods of economic instability compared to during stable times.

In **model (5)** post crisis period, I further examine the effect of corporate sustainability disclosure without including executive compensation in the model. I observe a significant positive association between both accounting finance experts and non-accounting finance experts on firm value (β = 0.177, p = 0.052); β = 0.138, p = 0.058), respectively. Further, my results show a significant positive association between audit committee chair and firm value (β = 0.156, p = 0.054). This implies in firms that have high CSD, there is a significant positive association between both finance experts (accounting certified and non-accounting certified) and firm value during stability times (β = 0.323, p = 0.005). And CSD and financial health (β = 0.151, p = 0.059). These results confirms my position for rejecting hypothesis 5b that state that the positive association between corporate sustainability disclosure and firm value is higher during periods of economic instability compared to during stable times. Further, I observed that, in the aftermath of the 2008/9 financial crisis, corporate governance disclosure has become a key component to investors when making investment decisions.

In **model (6)** post crisis times, I exclude accounting finance experts and non-accounting finance experts to further examine the combination of corporate sustainability disclosure and audit committee chair on financial health and firm value. The results show a

significant positive association between corporate sustainability disclosure and firm value ($\beta = 0.323$, $p < 0.005$). Further, I observe a significant positive association between corporate social disclosure and financial health ($\beta = 0.132$, $p < 0.099$). Moreover, I observe a positive association between audit committee chair experience and firm value ($\beta = 0.139$, $p < 0.096$). My results in model 6 amplifies the relevance of CSD in both periods of uncertainties and stable times

In **model (7)** post crisis period, I combine accounting finance experts and AC chair experience with corporate sustainability disclosure and exclude executive compensation. My results show a stronger association between accounting finance experts and financial health ($\beta = 0.107$, $p < 0.095$). Further, I observe a stronger association between accounting financial experts and firm value ($\beta = 0.115$, $p < 0.101$). My result for corporate sustainability disclosure also shows a significant positive association with both firm value ($\beta = 0.200$, $p < 0.016$) and financial health, respectively ($\beta = 0.117$, $p < 0.097$). Further, I observe a positive association between AC chair experience and financial health ($\beta = 0.059$, $p < 0.161$). My result in model 7 post crisis implies that there is a significant positive association between AC chair experience and firm value among firm with high CSD.

In **model (8)** post crisis, I exclude accounting finance experts and AC chair experience but include corporate sustainability disclosure (CSD) to further examine the strength of CSD. I observe that even in the absence of accounting finance experts and the AC chair experience, a combination of non-accounting finance experts and corporate sustainability disclosure can provide strong results. My results show a strong and positive association between non-accounting finance experts and financial health ($\beta = 0.199$, $p < 0.049$). Further, I observe a positive association ($\beta = 0.055$, $p < 0.149$) between non-accounting

financial experts and firm value. Consistent with my previous results in models (1) to (7), I observe that firms that have strong financial health usually have a strong firm value (β = 0.676, $p < 0.000$).

In **model (9)** post crisis period, I combine the entire latent construct in my models to examine their overall effect on financial health and firm value. I observe a significant positive association between accounting finance experts and firm value ($\beta = 0.173$, $p < 0.047$), a significant positive association between non-accounting finance experts and firm value ($\beta = 0.125$, $p < 0.058$), and a significant positive association between AC chair and firm value ($\beta = 0.151$, $p < 0.049$). Further, I observe a significant positive association ($\beta = 0.221$, $p < 0.041$) between executive compensation and firm value. I reject my hypothesis 6b that state that the positive association between the value of executive compensation and firm value is higher during periods of economic instability compared to during stable times. Further my result is consistent with previous studies that states that executive compensation levels are positively related to the firm's outcomes because firms reward highly competitive executives who can add value to the firm(Brick et al., 2006). Executive compensation has become a "hot topic" in most conversations regarding the 2008/9 credit crisis. Therefore, most firms have to justify their reasoning for paying higher executive compensation with higher performance.

Models (1) and **(2)** of Table 3.4 examine the lagged effects of firm value and financial health on current corporate sustainability disclosure and executive remuneration. My results in models (1) to (3) show that a lagged Tobin's Q ($\beta = 0.536$, $p < 0.000$; ($\beta = 0.426$, $p < 0.000$) has a significant positive association with the current corporate sustainability disclosure in model (3) ($R^2=0.439$). This result implies that TMTs prioritise market perception in their decision to report corporate sustainability. This result is consistent with the stakeholder theory, which implies that good corporate governance

prioritises investors' perception about the firm's sustainability disclosure. However, I observe that in model (1) and model (2) a lagged Z-score (β = -0.052, p < 0.250; (β = -0.074, p < 0.154) has an insignificant negative association with corporate sustainability disclosure. This result is consistent with Eccles, et al (2014), who posits that CSD is costly in the short term but has the potential to increase firm value in the long term. Further, my results in models (1) and (2) show that a lagged Z-score (β = -0.088, p < 0.111; β = -0.036, p < 0.271) has an insignificant negative association with current executive compensation. I observe in models (1) to (3) that there is a significant positive association between a lagged Z-score and Tobin's Q (β = 0.660, p < 0.000; β = 0.683, p < 0.000; β = 0.667, p < 0.000).

3.24.1 Conclusion

This chapter examines, conceptually and empirically, whether specific corporate governance mechanisms such as audit committee attributes, corporate sustainability disclosure and executive compensation make a difference to corporate financial health and firm value during crisis periods and stable periods. First, I provide conceptual overview of audit committee roles in the corporate governance system and implications on financial reporting quality. Further, I use the throughput model to discuss the different decision making pathways and different ethical positions that can influence audit committee behaviour and firm outcomes. In addition, I discuss the causes of the 2007/2008 GFC and the associated accounting misstatements that led to the collapse of top multinational companies. Moreover, I examine the motivations behind these fraudulent practices by applying the theories of fraud (fraud triangle theory, fraud diamond theory) and their relationship to the throughput decision making model etc. Second, I provide empirical evidence about the effects of audit committee attributes, corporate sustainability disclosure and executive compensation on corporate outcomes. In addition, I test my data for possibilities of earnings management.

I observe that the presence of accounting certified finance experts in the audit committee improves value and financial health of firms during crisis and stable times. However, this association is significant only during stable times in the case of non-accounting certified finance experts. Further, the experience level of the audit committee chair yields positive outcomes during both crisis and stable times. I report that higher levels of CSD improves corporate financial health and value during both crisis and non-crisis times. My results also suggest that when finance experts do not have accounting expertise, the sustainability of firms tends to compensate for this as it increase firm value and financial health. Similarly, the positive impact of experience of audit committee chairs is heightened with higher levels of sustainability.

CHAPTER 4

Managerial attributes, firm level information and corporate bankruptcy risk predictions

4.1 Abstract

In this chapter, I address the question of whether managerial attributes combined with good financial health mitigate corporate risk. I combine a traditional accounting-based model with unique managerial attributes, such as social capital, TMT innovativeness, accounting certified finance experts, non-accounting certified finance experts, TMT industry-specific experience, and a market-based model to predict the bankruptcy probabilities of firms. My results show that educational background and qualification level of TMT only has a significant impact on corporate financial health when combined with TMT innovativeness. Further, I observe that TMT social capital can mitigate the bankruptcy probability of firms when combined with TMT experience and innovativeness. I observe that the significance level of predicting bankruptcy risk increases further when managerial attributes are combined with an accounting-based bankruptcy model and volatility of corporate stock market returns. Further, I notice that TMT innovativeness combined with industry-specific experience has a significant negative association with bankruptcy risk.

4.2 Introduction

Bankruptcy risk is a global business menace that is affecting most business entities; this has been witnessed not just during the period of global financial recession but also during periods of stability. The failure of businesses has social, economic, political and technological effects. Businesses are part of the social system, people in the community derive their livelihoods from society, jobs, social infrastructure development, wealth distribution, etc., and businesses distribute economic resources (labour, capital

entrepreneurs) for economic growth and prosperity. Businesses are the backbone of economic development. Failure of businesses therefore can create economic instability, which in turn can lead to political unrest. Some of the benefits of society are derived from businesses. Previous studies have looked at bankruptcy risk from the perspective of the firm level and the market level. However, little research has been done on how different combinations of managerial attributes and firm level data can impact bankruptcy risk. I extend the literature by examining the probability of business failure by combining different managerial attributes to derive firm level information.

In this chapter, I present an empirical study that extends the accounting literature on bankruptcy risk. First and foremost, I provided some insight into my motivation for this study. Secondly, I conduct a systematic review of the existing literature to build an in-depth understanding about the extant accounting literature on bankruptcy cost. I then use the results from my systematic literature review to identify some of the existing gaps within the bankruptcy risk accounting literature. I then develop my research questions based on the existing gaps in the literature. Further, I develop my research objectives based on my research questions. Among the key questions that will be addressed by this study are the effects of individual managerial attributes on corporate failure.

4.3   Statement of the problem

Business organisations (both listed and non-listed companies) constitute the lifeblood of most economies. And as a human being cannot survive without blood, without effective business activities the economic, social and political infrastructure of countries will suffer catastrophic setbacks. This scenario was evident during the 2007/2008 global financial crisis, which originated in the United States of America. Bankruptcy risk is therefore of great interest to all stakeholders, including banks, governments, communities, employees and their families, lenders, shareholders, suppliers, the environment, etc. Given the wider interest in bankruptcy risk, superior information that will enable researchers to better

understand and predict bankruptcy risk is both paramount and valuable. Notwithstanding the urgency of this issue, I am still faced with the following problems: (1) researchers are still arguing about the superiority of their models, thereby causing confusion about which models provides the most significant forecast. (2) Most models have focused on accounting data (e.g. Altman, 1968; Zmijewski, 1984) or the volatility of market returns (e.g. Hillegeist, 2004; Campbell et al., 2008) or a combination of accounting data and market data (Bauer, 2014; Shumway, 2001). (3) Therefore, our understanding of bankruptcy risk is scattered amongst diverse models and frameworks. (4) The bankruptcy rate is still on the ascendency, irrespective of all the rhetoric surrounding the superiority of one model over the other. I argue that even though market and economic events are vital elements in predicting corporate failure, if decision makers are well educated and properly networked, with the right level of innovation a firm's survival rate will be enhanced.

As far as I am concerned, no studies have so far combined firm level data with corporate governance attributes such as innovation intensity, networking (elite network social capital-Oxbridge network and global elite network) academic education and professional education in examining the risk of corporate failure.

The study in this chapter is organised as follows. First, section 4.2 includes introduction to the study by covering areas such as; research problems, research objectives, motivations to the study and research contributions. Section 4.9 covers a systematic literature review (SLR) of the study. Thus In this section I use the SLR methodology to explore the gaps in the bankruptcy risk literature in order to identify key areas for contributions. Section 4.10 provides discussion about the main theories that underpins the key findings in this study. Section 4.12 involves variables constructions and hypothesis formulations for the study. Sections 4.13 explains the methodology use in this study and data collection. Section 4.14 considers analysis of results and discussions of key findings in the study. Last but not least, section 4.14.9 provides the final conclusions and implications to the study. Figure 4.1 below shows how this study is organised.
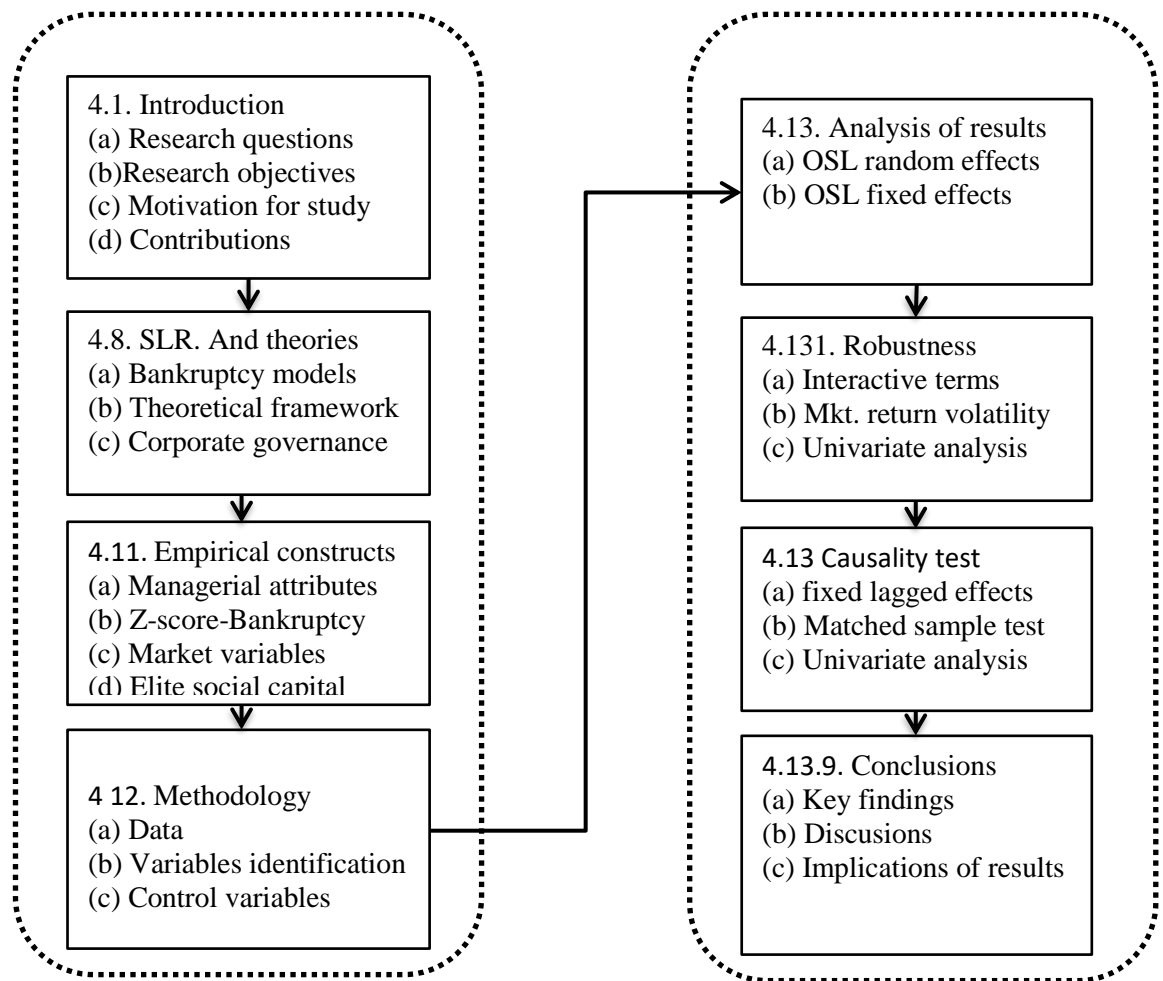
Figure 4. 1 Chapter summary

4.4 Research questions

The extant accounting literature has mainly looked at bankruptcy risk prediction from the perspective of either firm level data, market level data or the combinations of firm level and market level data. However, behind the firm level and market level data lies the human element (managerial attributes), which drives a firm's strategic decision orientations and choices. As far as I am concerned few or no studies have been conducted so far to increase our understanding regarding the extent to which managerial attributes (for example education, experience, networks, etc.), combined with firm level and market level data determine bankruptcy probability. I extend the literature by simultaneously

examining bankruptcy probability by combining firm level data, market level data and managerial attribute data to predict bankruptcy probability. I argue that the combinations of firm level data, market level data and managerial attribute data, including academic education, professional education, elite network social capital, and innovativeness (R&D intensity) are crucial predictors of bankruptcy probability. The upper echelon theory is based on the premise that corporate strategic decisions and performance are conditioned by managerial characteristics such as educational background and experience, network orientations, executive compensation etc. The results from my systematic literature review show a huge gap in the bankruptcy probability literature regarding managerial level data. I raise several questions: (a) does a combination of firm level data, market level data and managerial level data provide a better prediction regarding bankruptcy probability? (b) What is the association between managerial attributes and bankruptcy risk? (c) Will a combination of accounting data and managerial attributes increase the predictive strength of the bankruptcy model? (d) Will a combination of accounting data and managerial attributes increase the predictive strength of the bankruptcy model? (e) Does innovativeness have any effect on business failures? (f) Does a decision maker's academic educational background have any effect on business failure? (g) Does a decision maker's professional educational background have any effect on business failure? (h) Does an elite network social capital-Oxbridge network have any effect on business failure? (i) Does global elite network have any effect on business failure? (j) Does a combination of academic education and innovativeness have any effect on business failure? (k) Does a combination of professional education and innovativeness have any effect on business failure? (l) Does a combination of elite network social capital-Oxbridge network and innovativeness have any effect on business failure? (m) Does a combination of global elite network and innovativeness have any effect on business failure? (n) Is the market-based bankruptcy model combined with managerial attributes a better predictor

of corporate failure? (o) Is the accounting-based bankruptcy model combined with managerial attributes a better predictor of corporate failure?

4.5   Research objectives

My objective for this study is to extend our understanding on the extent to which combinations of corporate governance data with accounting data and finance data can increase the predictive strength of the bankruptcy model. Previous studies have focused on either accounting data or finance data or both in predicting corporate failures with little or no emphasis on managerial level data. I argue that the quality of governance (corporate governance) has been and continues to be the main cause of corporate failure. Most of the largest corporate scandals, such as Enron, WorldCom, Lehman brothers, Saytem etc., were caused by poor corporate governance practices (Coffee Jr, 2003; Acharya & Richardson, 2009; Christopoulos et al., 2011). Further, most of the accounting and finance variables used by previous studies focus mainly on figures and "number crunching", with less emphasise on the people behind the numbers. I extend the accounting and finance literature on corporate governance by identifying key managerial attributes that influence their behaviour in managing bankruptcy risk.

4.6   Motivation for the study

My motivation for this study is linked to the integrated reporting standards (IRS) 2013 that require companies to enhance their report on value creation (both in the short term and the medium term) with less emphasis on issues related to corporate bankruptcy. I argue that companies that have less probability of bankruptcy have the capacity to create value as well as respond to the legitimate needs of their stakeholders. This study therefore aims to provide a different perspective to the IRS to highlight the key elements that can predict bankruptcy risk. Further, I focused this study on the UK because the UK is

considered one of the most important worldwide economic markets. For example, the London stock exchange is rated the third largest in the world after the New York Stock Exchange and the NASDAQ in the United States. Previous studies on bankruptcy risk have disproportionately focused on the US market. Our understanding of bankruptcy risk in the UK market is thus limited and scattered. Further, a substantial volume of the corporate failure literature has mainly relied on US data to extend Beaver (1966) early univariate approach and Altman's (1968) multiple discriminant analysis model. The UK and most European firms use principle-based accounting standards, which are different from the US rule-based accounting standards. Studies that combine accounting data with managerial attributes to explore bankruptcy risk on firms in a principle-based accounting jurisdiction such as the UK is limited. I therefore extend the bankruptcy risk literature by looking at bankruptcy risk from the principle-based accounting data perspective. Further, I combine the accounting-based bankruptcy risk approach with unique corporate governance attributes which are all conditioned by the UK Corporate Governance Code.

4.7   Research contributions

Previous studies on bankruptcy have concentrated on providing bankruptcy models that can predict corporate failures, but the empirical results from their findings are mixed. There are a number of studies that propose the need to combine firm characteristics such as managerial attributes with accounting-based bankruptcy models to strengthen the predictive powers of the bankruptcy models (Daily, 1994; Franzen, 2007; Verwijmeren, 2010). However, little or no empirical studies have combined unique managerial attributes such as academic education, professional education, and elite networks (elite network social capital-Oxbridge), with firm level accounting data to analyse corporate failure. For example, Platt and Platt (2012) conducted a conceptual study that focused on

a compilation of statistics which enabled a comparison of board attributes of bankrupt and non-bankrupt companies. They called for a further study that addressed the question of whether these board attributes were important antecedents of corporate bankruptcy. Further, they called for an additional study that would provide a robust empirical analysis of the explanatory power of corporate board attributes and traditional financial ratios on bankruptcy risk (Platt & Platt, 2012). This study provides a response to this call. Further, I contribute to the extant accounting literature by extending the existing literature on bankruptcy risk, focusing mainly on firm level information by combining it with unique managerial attribute to assess their overall impact on corporate failure. The existing literature that relies on both firm level information and market information has been providing mixed results over the years. However, as far as I am concerned, few studies have been done on the human element side of bankruptcy risk prediction. The extant bankruptcy risk literature has over the years either focused on traditional accounting-based ratios or on market-based data, mainly using a contingency claim approach model to predict bankruptcy risk. I argue that accounting ratios are prepared by human beings who can manipulate accounting data. Therefore, to better understand bankruptcy risk, there is a need to go beyond accounting data to study the human characteristics behind the accounting figures. Further, I extend the accounting literature on bankruptcy risk by performing a comparative analysis by combining the market-based bankruptcy model and managerial attributes and comparing my empirical results to the results obtained from the combination of the accounting-based model and managerial attributes. I argue that by combining accounting ratios with the unique attributes of the decision makers who prepare the accounting data and the ratios, I will be able to obtain a better understanding of the causes of corporate failure. Further, I introduce trust issues relating to bankruptcy risk into these studies, which is a new concept in the bankruptcy risk literature. I argue that all business activities, transactions and decisions are conditioned by trust. Therefore,

there is a need to identify the trust issues that underpin each of the bankruptcy risk models. Trust is the "pivot" upon which the wheels of business rotate, and there can be no meaningful business transaction without trust. However, discussions about trust in the extant bankruptcy risk literature are scattered and shallow. In order to understand the role of trust in corporate failure, I extend the bankruptcy literature by providing some information about the different trust positions that relate to the dominant bankruptcy models in the accounting literature. Against the backdrop of the above discussions, I organise this study into twelve chapters. The first chapter introduces my studies by providing the abstract and the research context. The second chapter provides my research objectives, the research question and a systematic literature review. My third chapter provides my literature analysis. In the fourth chapter I explain my empirical construct and the theoretical underpinning of my study. My fifth chapter considers my data.

4.8   Research context

The risk of a firm going bankrupt is a major issue of concern to shareholders and most stakeholders in every firm. Over the years, a vast body of literature has been devoted to assessing the probability of firms going bankrupt. The extant literature on bankruptcy is saddled with a multiplicity of different complex predictor models of firm bankruptcy (Bauer, 2014; Darrat, 2016; Altman, 2017). The literature on predicting corporate bankruptcy started with Beaver (1966), whose primary concern was not the analysis of the traditional accounting financial ratio per se but rather the use of the financial ratio as important predictor of important events concerning firms, one of which being the failure of firms (Beaver, 1966). Since Beaver (1966), several studies focusing on bankruptcy prediction have emerged. Most of these literature offers several competing empirical models using alternative explanatory variables and statistical methodologies for bankruptcy model estimation (Hillegeist, 2004; Agarwal, 2008; Lee, 2013; Darrat, 2016; Altman, 2017). The extant bankruptcy literature can be categorised under three major

dominant models, namely the traditional model, the hazard model and the contingency model. The traditional models are predominantly based on accounting information and traditional accounting financial ratios (e.g. the Altman Z-score). The hazard models employ both accounting and market data to predict the probability of firms going bankrupt (e.g. Shumway, 2001). The contingency models in contrast are based on stock and option pricing. For example, the contingency claim-based model views equity as a call option on assets (Vassalou & Xing, 2004). The discriminatory power of the various bankruptcy models can be categorised into three main dimensions: the ability to discriminate between bankrupt firms and non-bankrupt firms, the incremental bankruptcy information that can increase the significant of model predictions, and the power of the model to predict bankruptcy under different cost misclassifications (Bauer, 2014). Different models take different perspectives and approaches for predicting corporate failure. Some models that take the perspective of the shareholder rely mostly on the traditional accounting ratios, including profitability, solvency and liquidity leverage (Altman, 1968; Ohlson, 1980; Beaver, 2005; Altman, 2017). However, critics of the traditional accounting model argue that accounting ratios are based on historical cost and the preparation of the financial report is governed by the international financial reporting standards. As a result, the traditional accounting standards have limited power in predicting corporate failure (Shumway, 2001; Hillegeist, 2004; Duffie, 2007; Campbell, 2008; Lee, 2013). In furtherance to this argument, some scholars argue that the failure of firms should not be assessed only from the shareholders' interest maximisation perspective but also from the perspective of the wider stakeholder effect by considering the market-based conditions and the industry within which the firm operates (Shumway, 2001; Campbell, 2008; Verwijmeren, 2010; Lee, 2013). The models which consider bankruptcy prediction from the market-based perspective mostly use a contingency-based approach to assess the likelihood of firms going bankrupt (Shumway, 2001; Agarwal, 2008; Bryan, 2013; Lee,

2013). Scholars who favour the market-based contingency approach models argue that in addition to the traditional accounting ratios, factors such as option pricing, stock returns, and stock price volatility better reflect future expected cash flows and hence should be more appropriate predictor variables than the traditional accounting ratios (Agarwal, 2008; Campbell, 2008; Kumar, 2012). For example, Hillegeist et al. (2004) argue that the Black– Scholes–Merton (BSM) structural model is up to 14 times more informative and has more power to predict corporate bankruptcy than the Altman (1968) Z-score. The market-based perspective bankruptcy models counter most of the limitations of the traditional accounting based-model. For example, market variables are unlikely to be influenced by a firm's accounting policies, market prices reflect future expected cash flows, and the output of the market-based models is not based on historical time or internally generated accounting samples (Agarwal, 2008). Further, since equities are traded daily, a bankruptcy model that is based on equity prices (provided financial markets are somewhat efficient) produces asset values that are much more up to date and reliable than the historical accounting-based model. Notwithstanding the above strength of the market-based bankruptcy models, some scholars argue that the assumptions underlying the market-based models are mostly unfounded (Agarwal, 2008). For example, the assumption that in a perfect market the stock prices reflect all the available information is not always the case (Agarwal, 2008). Further, Allen and Saunders (2002) posit that the assumptions underlying the theoretical model of the market-based bankruptcy model require the normality of stock returns. Further, it requires a measure of the assets' value underlying the causes of stock prices volatility, which are unobservable (Allen & Saunders, 2002; Hillegeist, 2004; Campbell, 2008). In addition, most of the statistical approaches used in the market-based bankruptcy models are not strong enough to capture the dynamics of the stock market variable used in the model, especially variables such as option prices and stock return, volatility (Allen & Saunders, 2002;

Hillegeist, 2004; Duffie, 2007; Agarwal, 2008; Campbell, 2008). It is not surprising that the empirical evidence on the performance of the market-based bankruptcy model is mixed (Agarwal, 2008). For example, Hillegeist et al. (2004) argue that their market-based model has more predictive power than the traditional accounting ratio-based models. In contrast, Campbell et al. (2006) argue that the market-based models have little forecasting power after controlling for other variables. Further, Reisz and Perlich (2007) observe that the Altman Z-score (1968) performs slightly better over a one-year period than their market-based bankruptcy model. However, from a more long-term perspective, the market-based model has greater predictive power in comparison to the traditional accounting-based models (Reisz & Perlich, 2007). Reisz and Perlich (2007) argue that for better models that have significant powers to predict the bankruptcy of firms, a combination of traditional accounting-based and market-based models is preferred. In furtherance to this argument, Shumway et al. (2001) posit that the probability of a firm going bankrupt should be analysed from the perspective of a hazard model which incorporates a pre-bankruptcy time horizon to provide hazard warnings for the pre- and post-accounting data. For example, they argue that ten years of initial firm bankruptcy data could be used in the hazard model to provide information about the early signals of firms going bankrupt. On the other hand, the hazard model also makes a provision for firms to use market-based data and cash flow data to make a forecast about the probability of firms going bankrupt (Shumway, 2001; Beaver, 2005). Other scholars argue that employees are the "golden goose" that lays the "golden eggs". Therefore, unsatisfied employee will ultimately result in lower productivity (Verwijmeren, 2010). Developed models that take into account employee satisfaction are a key factor to consider when predicting firm failure. Virwijmeren et al. (2010) posit that firms with good track records in employee well-being significantly reduce their probability of bankruptcy by operating with lower debt ratios. Further, they observe that most firms with better employee track

records have better credit ratings, even after controlling for differences in firm leverage (Verwijmeren, 2010).

The employee-based bankruptcy model developed by Virwijmeren et al. (2010) is significant when the employee satisfaction rate variable is combined with the traditional accounting ratio variables (Verwijmeren, 2010). A recent review of the efficacy of the most popular bankruptcy models, including hazard models, market-based models and accounting-based models, show that there is almost no difference between the predictive accuracy of the accounting-based model and the other bankruptcy models (Altman, 2017). The use of the accounting-based model allows for firm-specific risk adjusted return on operational activities (Altman, 2017). Even though the Z-score model was developed more than 46 years ago and many alternative bankruptcy models have evolved over the years, its financial distress prediction ability and use in analysis in both research and practice make it one of the most popular models worldwide (Altman, 2017).

Therefore, in this study I use the accounting-based Z-score model as my dependent variable to analyse the individual statistical significance of my variables in predicting corporate failure amongst FTSE 350 companies. I contribute to the extant bankruptcy literature in six ways. I analyse the effects of top management educational background as a dichotomous variable in my model to identify its effect in predicting financial health of firms. As far as I am aware, no other previous study has explored TMT educational background together with other corporate governance attributes on financial health using the Altman Z-score as a dependent variable. To the best My knowledge, most of the studies on corporate insolvency and bankruptcy risk prediction have been done in the US, and while some studies have been conducted on bankruptcy risk prediction in the UK, these were mainly in the 1980s and the early 1990s. This study therefore employs a recent UK dataset to provide a new awareness about unique managerial attributes that can enhance corporate financial health.

4.9 Systematic literature review of the existing literature on bankruptcy risk

Similar to the previous chapter I use a systematic literature review in this study to identify the gaps in the bankruptcy risk literature and also to bring together existing evidence-based studies on bankruptcy risk.

Further, the systematic literature review (SLR) in this study aims to ensure transparency, clarity and focus (Thorpe et al., 2005). Following Thorpe et al. (2005), I adopt a three-stage systematic literature review process: (1) database searching, which involves searching through three main databases (Google Scholar, Web of Science and EBSCO); (2) exclusion analysis, which uses advanced search criteria to narrow down my search findings to key peer-reviewed articles on bankruptcy risk; and (3) citation analysis to identify the top 15 articles (experts) on bankruptcy risk. Figure 4.2 shows the three stages.

Stage 1: searching the database:
We used phrase including "bankruptcy risk, corporate failure and corporate performance or firm performance" bankruptcy probability models, risk, Altman z-score, bankruptcy risk models etc. synonyms; corporate failure, going concern, etc. to search the data base: advance search criteria -peer review articles Number of searches found (98,789)

Stage 2: Exclusion analysis
we used the advance search criteria-Subject: accounting, finance and management, Articles: peer review, phrase; "accounting based bankruptcy", "market based bankruptcy", "hazard bankruptcy", Exclusion criteria, year = 2000-2018, Peer reviewed articles in $3-4*$ ABS. Number of searches found (245)

Stage 3 Citation analysis
Using citation analysis we narrowed our search results by focusing on the top 15 most cited articles on bankruptcy risk and firm performance.
Number of searches found (15)

Boolean searches

Figure 4. 2 Systematic literature review on corporate risk - chart

Similar to the previous chapter, I provide the results of my citation analysis and other statistical information about leading authors and literature on corporate bankruptcy risk in table 4.1. Further results on systematic literature review can be found on figures 4.3 and 4.4

Table 4. 1 Fifteen most cited journals on Bankruptcy risk

Author	Year	Journal	citations	Citation analysis
Altman, Edward I	1968	The journal of finance	14646	60.1%
Daily, et al	1994	Academy of Management journal	912	3.7%
Altman, Edward I	2000	Journal of Finance	1136	4.7%
Shumway, et al	2001	The journal of business	2317	9.5%
Hillegeist, et al	2004	Review of accounting studies	1178	4.8%
Beaver, et al	2005	Review of Accounting studies	373	1.5%
Duffie, et al	2007	Journal of Financial Economics	947	3.9%
Campbell, J et al	2008	The Journal of Finance	1512	6.2%
Agarwal, et al	2008	Journal of Banking & Finance	400	1.6%
Uotila, et al	2009	Strategic Management Journal	600	2.5%
Wu et al	2010	Journal of Contemporary Accounting & Economics	133	0.5%
Bauer et al	2014	Journal of Banking & Finance	71	0.3%
Altman, et al	2017	Journal of International Financial Mgt. & Accounting	30	0.1%
Darret et al	2016	Journal of Accounting, Auditing & Finance	20	0.1%
Franzen et al	2007	The Journal of Finance	86	0.4%
Total Citation			24361	100.0%
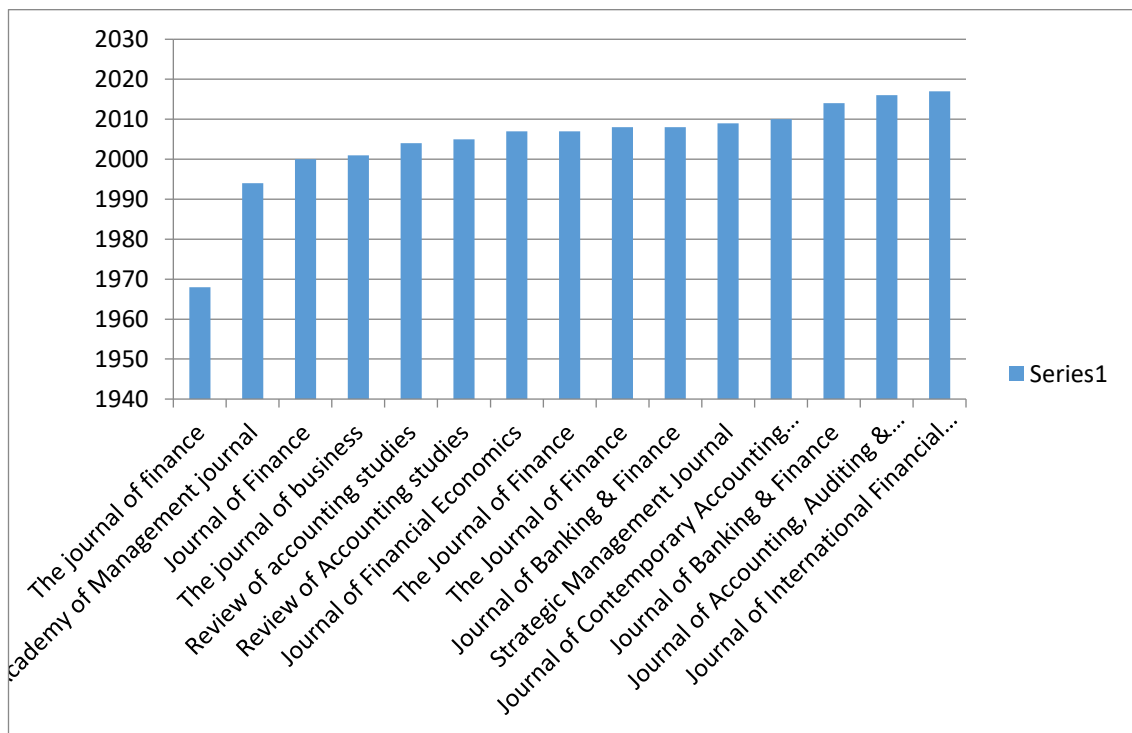
Figure 4. 3 Top 15 most cited journals on Bankruptcy risk from 2000-2017
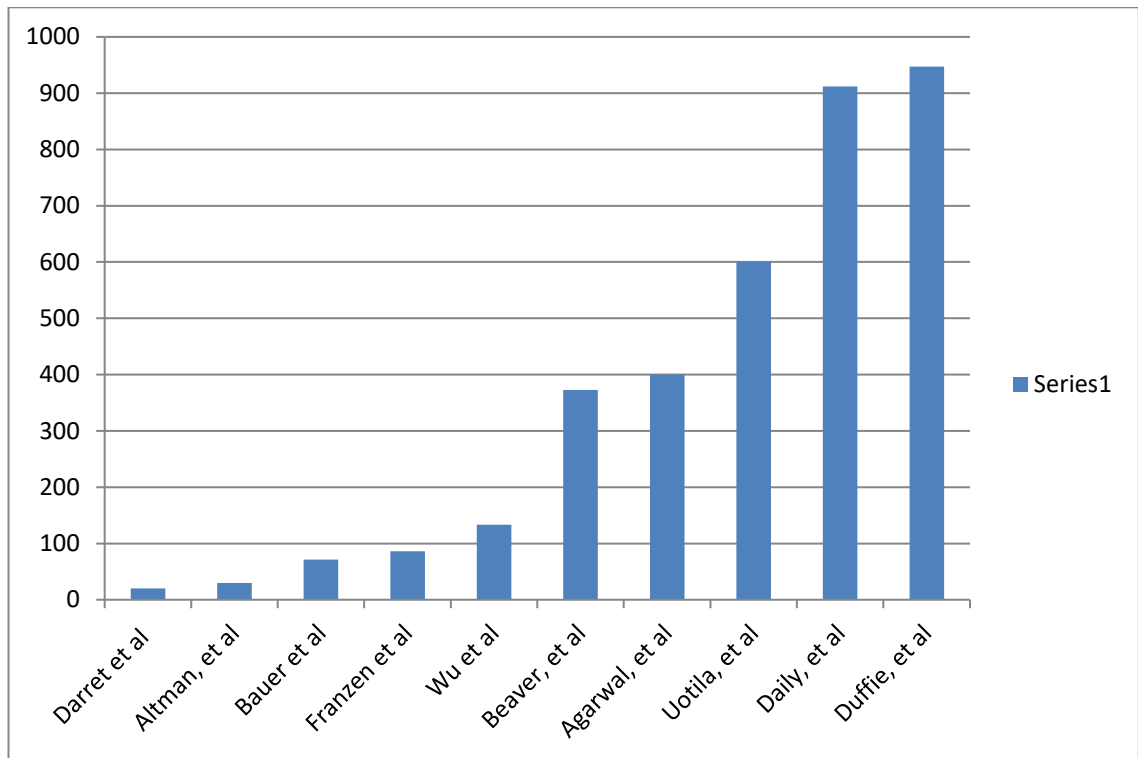
Figure 4. 4 Top fifteen most cited authors on bankruptcy risk 2000-2017

Table 4.2 examine the focus, comments and perspective of some of the leading experts on corporate bankruptcy risk.

Table 4. 2 Literature review on corporate risk and outcomes

Author	Focus	Sample/Period	Methodology	Citation n	citations	Perspective
Altman, Edward I (1968)	Traditional accounting to predict bankruptcy risk	Data drawn from 66 US firms collected from 1946-1965	Multiple discriminant regression analysis	14646	60.1%	94% accuracy level in predicting bankruptcy risk
Daily, et al (1994)	Corporate governance and bankruptcy risk prediction	114 US firms period of ten years from 1972-1982	Logistics regression analysis	912	3.7%	Corporate governance quality has negative association with bankruptcy risk
Altman, Edward I (2000)	Z-score and bankruptcy risk prediction.	111 bankrupts and non-bankrupts firms from 1969-1975	Multiple discriminant regression analysis	1136	4.66%	The Z-score model has a strong bankruptcy risk predictive power
Shumway, et al (2001)	The hazard model posit that, bankruptcy risk changes with time	300 bankruptcy firms listed in AMEX and NYSE between 1962 and 1992	Discriminant analyses/ Logit estimation model	2317	9.5%	Hazard model argue that combinations of accounting and market based model is preferred
Hillegeist, et al (2004)	A combination of BSM probability model and accounting model	756 bankruptcy firms during 1980-2000	Logistics regression analysis	1178	4.8%	Market return volatility component of the BSM-model is superior in bankruptcy risk prediction

Author	Focus	Sample/Period	Methodology	Citation	citations	Perspective
Beaver, et al (2005)	Hazard model in predicting bankruptcy	8130 firm year observation data from 1962 - 2002	Logistics regression analysis	373	1.5%	A combination of accounting ratios and market related variables provide a stronger predicator to bankruptcy.
Duffie, et al (2007)	Combinations of firm-specific and variables macroeconomic variables can predict bankruptcy risk	2700 US industrial firms from 1980-2004	Maximum likelihood estimation	947	3.9%	The probability of bankruptcy is dependent on firm specific and macroeconomic covariates
Franzen et al (2007)	Combinations of R&D spending and accounting ratios to predict bankruptcy.	2262 bankruptcy filings from 1981 2004	Discriminant analysis	86	0.4%	R&D spending can determine bankruptcy risk
Campbell, John et al (2008)	Combinations of accounting based variables and stock market variables	232 bankruptcies data from 1963 to 2003	Logistics regression analysis	1512	6.2%	Stock that has high risk of failure are highly volatile. Further, distress stock moves with market conditions
Agarwal, et al (2008)	Comparison of market-based and accounting-based bankruptcy prediction models	UK LSE listed firms 1985-2001.	OLS regression analysis	400	1.6%	Little difference in the predictive abilities of the accounting based and market based bankruptcy models
Uotila, et al (2009)	Firms exploration and exploitation activities can influence bankruptcy	279 US listed firms 1989 to 2004.	Generalised Method of moments (GMM)	600	2.5%	The interaction between R&D and firm operational efficiencies can have a positive effect on performance.

Author	Focus	Sample/Period	Methodology	Citation	citations	Perspective
Wu et al (2010)	Comparisons of five bankruptcy models	887 bankruptcies firms from 1980 to 2006.	Logistics regression analysis	133	0.5%	There is minimal difference between the predictive power of accounting based model and the market based model
Bauer and Agarwal (2014)	compare hazard model with accounting based model	UK listed companies from 1979 - 2009	OLS/Logit regression	88	0.9%	Hazard is superior to the accounting based model because it time varying covariate predictor
Tian, et al (2015	Variable selection and corporate bankruptcy predictions	US listed company data from 1980 - 2009	OLS regression analysis	46	0.1%	Accounting ratios contains Significant incremental predictions about bankruptcy risk.
Darret et al (2016)	Corporate governance and bankruptcy risk prediction	Listed Compustat firms from 1996-2006	logit regression model	20	0.1%	Proportion of inside directors is inversely associates with bankruptcy risk
Altman, et al (2017)	Application of Altman Z-score in different countries	Firms from 31 European and 3 non-European countries	Logistics regression analysis	30	0.1%	Z-score model works for all countries, especially when specific country risk is included in the model

The extant literature on corporate bankruptcy risk originated with Beaver (1966), who used accounting information as a predictor of corporate failure. In furtherance to Beaver's study, several bankruptcy models were developed to enable both researchers and decision makers to predict the probability of failure of firms. The dominant bankruptcy models can be categorised into three main headings, namely the traditional accounting-based model (e.g. (Altman, 1968), the contingency claim-based model, which views equity as a call option on assets (e.g. Vassalou and Xing, 2004), and the more recent hazard model, which combines accounting and market data to predict the probability of firms going bankrupt.

4.9.1 The going concern accounting concept and bankruptcy risk

The ability to predict a firm's going concern is an important and challenging task for both directors and auditors due to the risk of misjudgement (Yeh et al., 2014). Going concern is a fundamental accounting concept that underlines the preparation of financial statements of all UK companies. Under the going concern concept, it is assumed that a company will continue in operation for the foreseeable future and that there is neither the intention nor the need to liquidate the business of the firm (Council & Britain, 2009). According to the international accounting standard 1 (IAS 1), when preparing financial statement, management shall make an assessment of the firm's ability to continue as a going concern. According to the guidance for directors of UK companies (2009), directors should consider all available information about the future of their firms when deciding whether their firm is a going concern at the approval date of their financial statement. Thus, directors should make a proportionate, balanced and clear disclosure about any material uncertainties or bankruptcy risk that significantly impinge upon the going concern assumptions of their firm. Their review should usually cover a minimum of twelve month from the date of approval of annual financial statement (Council & Britain, 2009). The UK GAAP and the international financial reporting standards as adopted by

the EU (EU IFRS) require all directors of UK listed companies to satisfy themselves whether it is appropriate to prepare their financial statement on a going concern basis (Council & Britain, 2009). Where companies are facing difficulties, such as economic uncertainty, financial difficulties, or liquidity problems, directors should conduct and document a rigorous assessment of the situation and even take legal advice before making any decision concerning liquidation. The UK GAAP and IFRS require directors to perform a series of tests and reviews, such as impairment reviews and additional disclosure, to ensure that the financial statement presents a true and fair view. In a situation where there are material uncertainties that cast significant doubt on the company's ability to continue as a going concern, then directors should make a proportionate, balanced and clear disclosure about the going concern for the financial statement to show a true and fair view. Under listing rule 9.8.6R(3), all directors of listed companies in the UK have to include in their annual report a statement that the business is a going concern, in addition to supporting qualifications if and as necessary (Council & Britain, 2009). Further, previous studies posit that the first time communication of a going concern modification by the auditors of a firm decreases the market trust in the firm's governance system and increases the risk of bankruptcy (Blay et al., 2011).

Thus, the announcement of going concern shifts investor focus from the income statement to the balance sheet and the corporate governance attributes of the firm (Blay et al., 2011). Therefore, managerial attributes, such as their educational background (Bhagat et al., 2010; Yeh et al., 2014; Volonté, 2016b) and risk appetitive (Berger et al., 2014), are brought into the limelight during the periods preceding corporate bankruptcy (D'Aveni, 1990; Lee & Brinton, 1996; Blay et al., 2011). Managers who come from an elite university background with a high level of education and industry-specific knowledge will be better "positioned" to ameliorate the risk of bankruptcy in comparison to their counterparts who are less educated and have less industry-specific knowledge (D'Aveni,

1990; Lee & Brinton, 1996; Datta & Iskandar-Datta, 2014). Further, CEOs from an elite university background have power through access to superior information and resources from the local and global elite network and institutions (e.g., political elites, economic elites, academic elites). D'Aveni (1990) argues that directors from an elite university background enjoy some level of prestige to the extent that they are less likely to be punished because at each stage of the attribution process the high status deviant enjoys significant advantages over their lower status counterparts. In furtherance to this argument, previous studies show that directors who have ties to an elite university background mostly have access to unique information as well as a bargaining power advantage that can lower their transaction cost or risk of bankruptcy (Sauerwald et al., 2016).

4.9.2 Research and development intensity and bankruptcy risk

The bankruptcy prediction models propounded by Altman (1968), and Ohlson (1980) have been used in varieties of contexts in accounting and finance literatures (Franzen, 2007). These accounting based models utilises balance sheet and profit and loss data thereby making the models sensitive to changes in the accounting reporting standards (example changes in the IAS and IFRS). Evidence gathered over the last few decades suggest that, increase expensing of R&D spending can have a devastating effects on earnings of R&D intensive firms (Lin, 2006; Franzen, 2007; Eisdorfer, 2011). Therefore, some scholars argue that, just relying on the accounting based model in predicting bankruptcy probability is misleading. Thus there is higher likelihood of misclassifying higher intensive R&D firms as highly distress because of their higher R&D spending. To address this problem I included R&D intensity as one of the key constructs to measure firm value. Further I used combination of accounting data, stock market data, and TMT attributes in my models to predict bankruptcy probabilities in firms

4.9.3 Capital structure and bankruptcy risk

In capital-oriented market economies, such as the UK and the US, the type of capital structure model selected by a firm plays a pivotal role in determining the survival or demise of the firm (Antoniou et al., 2008; Fan et al., 2012; Cole, 2013). The extant finance literature shows that growth opportunities in most firms are conditioned by capital assets. In furtherance to this argument, some scholars argue that it is rather the type of capital structure model (a combination of equity and debt) that determines the future growth or failure of a firm. Most capital structure theories argue that the type of assets controlled by a firm (Titman & Wessels, 1988; Mac an Bhaird & Lucey, 2010; Shubita & Alsawalhah, 2012), the unique firm attributes (Titman & Wessels, 1988; Harford et al., 2012; Morellec et al., 2012), and the opportunistic behaviour of its decision maker (Jensen & Meckling, 1976; Fama & Jensen, 1983a) usually determine its capital structure. For example, Titman and Wessel (1988) argue that equity-controlled firms usually prefer to invest sub-optimally in order to expropriate wealth from the firm's bondholders. In furtherance to this argument, Jensen and Mackling (1976) argue that stockholders of leveraged firms have a tendency to invest sub-optimally to expropriate wealth from the bondholders of the firms. Titman and Wessels (1988) argue that by selling secured debt, firms increase the value of their equity by expropriating wealth from their unsecured creditors. Collateralised debt usually restricts borrowers to using the funds for specific purposes (Titman & Wessels, 1988). Creditors of collateralized debt mostly demand better favourable terms and also have the tendency to closely monitor the actions of their borrowers to reduce the agency cost. This restricts the capacity of mangers to engage in opportunistic behaviour. Some scholars argue that in order to reduce the agency cost, firms have to select a capital structure that involves more collateralised assets to restrict managerial opportunistic behaviour and resources misappropriation (Smith Jr & Warner, 1979; Hovakimian et al., 2004; Rauh & Sufi, 2010).

4.9.4 Conflicts in the literature regarding capital structure

The theoretical framework underpinning capital structure is clouded by a multiplicity of contradictions. The Modigliani-Miller theorem opened the literature on capital structure with the argument that in a perfect capital market the costs of different forms of financing do not vary independently and therefore there is no extra gain from opportunistically choosing from different capital structures (Rauh & Sufi, 2010; Gill et al., 2011). Other studies have criticised the M-M argument on the basis of its unrealistic assumption of a perfect capital market. In most capital markets there exist problems, such as information asymmetry, tax cost and agency cost, which makes the M-M argument nonsensical (Antoniou et al., 2008; Mac an Bhaird & Lucey, 2010). Further, the perking order theory, which is founded on information asymmetry, argues that firms do not have leverage targets. They only use retained earnings or debt in financing their activities and raise external equity capital as a last resort. In contrast, concerning the perking order argument, the market timing theory argues that managers could minimise the cost of capital by timing the market (issuing equity when the share price increases). This implies that it is the market condition that influences the pecking order (Antoniou et al., 2008). On the other hand, the agency theory argues that managerial self-interest is the key factor that determines the choice of the capital structure of firms (Jensen & Meckling, 1976). For example, previous studies have provided mixed results regarding the effects of leverage on financial health and performance (Agarwal, 2008; Kumar, 2012; Bryan, 2013; Darrat, 2016). I contribute to the bankruptcy risk literature by simultaneously examining firm leverage and other accounting data together with managerial attributes to provide a different perspective on bankruptcy risk.

4.9.5 Basel reforms and corporate capital adjustment

The Basel Committee consisted of representatives from central banks and regulatory authorities of the group of ten countries including Spain and Luxemburg. Since 2009, it has included all the G-20[8] major countries. Basel I involved deliberations by central banks around the world in 1988 that focused on setting minimum capital requirements for banks. Later, a new set of banking laws and regulations that protect banks from undertaking excessive risk and that safeguard solvency were published in June 2004. This second agreement was referred to as Basel II. However, Basel II was criticised for its inability to prevent the 2007/2008 credit crisis. The inefficiencies revealed by the credit crisis resulted in the formulation of Basel 111. The main focus of Basel III was to provide a global regulatory framework (voluntary) on banks' stress testing, capital adequacy, and market liquidity. The capital adequacy provides guidelines on the amount of capital a bank or financial institution has to hold as required by its financial regulator. This is normally expressed as the capital adequacy ratio of equity as a percentage of the risk-weighted assets of the firm. The stress testing provides adverse economic scenarios that test the capabilities and capacity of the firm to withstand adverse economic situations. The overall objectives of Basel I, Basel II and Basel III are to provide a regulatory framework that enables institutions to avoid bankruptcy risk.

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[8] The G-20 is an international forum consisting of governors, central banks and the governments of Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Mexico, Japan, South Korea, Russia, Saudi Arabia, South Africa, the UK and Turkey.

4.10   Corporate bankruptcy risk prediction models

The last decades has witnessed the development of several bankruptcy theories and verities of empirical models to predict corporate bankruptcy risk. One of the greatest accomplishments of finance and accounting is the development of empirical models that successfully discriminate between firms that remain solvent and firms that have a higher likelihood of going bankrupt. Broadly, there are three categories of bankruptcy risk prediction models (Franzen, 2007; Agarwal, 2008). First is the traditional accounting based models such as Altman (1968) which relies mainly on accounting data. Second is the market based which relies on market data such as stock market returns etc. (Agarwal, 2008). Third is the contingency claim approach (CCA) which has its foundation in Black-Scholes-Merton option pricing theory. The CCA offer a theoretically grounded default assessment model by examining the probability that the market value of an entity is likely to fall below the value of its liabilities at some time in future(Lewis, 2012a)

4.10.1   The traditional accounting model

Beaver (1967) introduced the traditional accounting model by applying a t-test to evaluate the significance of individual accounting ratios within a similar pair-matched sample. Beaver's studies were later extended by Altman in 1968, who employed a multiple discriminant analysis on traditional counting ratios to test a similar paired-matched sample. The Altman Z-score model developed by Altman (1968) is mainly based on traditional accounting ratios, including profitability ratios, liquidity ratios, and leverage and solvency ratios, as the main explanatory variables for predicting corporate bankruptcy (Altman, 1968). Altman (1968) employed a multivariate discriminant analysis (MDA) on traditional accounting ratios to identify the key ratios that have a statistically significant association with predicting corporate bankruptcy (Altman, 1968). In 1980, James Ohlson applied a logit regression to accounting ratios by using larger samples that did not involve a pair-matching sample. The Altman Z-score traditional accounting-based bankruptcy

model still remains a popular model in both academia and the commercial world for predicting corporate bankruptcy. The accounting data-based bankruptcy prediction models filter key information from publicly available financial reports to assess the bankruptcy risk of firms (Bauer, 2014).

However, other empirical research on bankruptcy prediction has criticised the traditional accounting model. Amongst the main criticism levelled against the traditional accounting ratio-based models is the fact that financial report figures can be subjected to manipulations and managerial discretions, which can have a negative impact on the financial reporting quality. Further, conservatism and historical cost accounting imply that the true asset value may be significantly different from the book value. Hillegeist (2004) argues that since the financial reports are prepared with the assumptions of a going concern, their ability to predict bankruptcy may be limited. Additionally, the conservatism accounting principle usually causes assets to be understated relative to their market value, especially for intangible assets and fixed assets. Thus, accounting conservatism causes accounting-based leverage measures to be underestimated. Further, the accounting-based measure fails to incorporate asset volatility or the volatility of market returns. Volatility plays a crucial role in predicting bankruptcy risk because it captures the probability of a firm's assets declining. Volatility of firm's returns in the stock market is a vital variable in the bankruptcy prediction models of Altman (1968) and Olhoson (1980).

4.10.2 The market-based model

The market-based bankruptcy prediction models investigate the probability of corporate failures, mainly through the options view of firm equity. The stock market data provide invaluable information regarding the probability of bankruptcy because it provides information about the volatility of asset returns. The market-based model, also known as the contingency-based model (CBM), has dominated the second generation literature on

bankruptcy predictions models. The CBM draws from the strength of the Black and Scholes (1973) and Merton's (1974) option pricing framework. The BSM model counters most of the above criticisms of the accounting-ratio based model. Unlike the accounting ratio-based model that relies on historical accounting information, the CBM relies on data from the stock market, such as option pricing and the volatility of stock returns (Shumway, 2001; Hillegeist, 2004; Reisz & Perlich, 2007; Campbell, 2008). The BSM model has been among the most widely used and influential models in finance used to investigate default probabilities and recovery rates (e.g. Bruche and Gonzalez-Aguado, 2010), default risk and returns (Vassalou & Xing, 2004; Chava & Purnanandam, 2010; Da & Gao, 2010; Li & Miu, 2010).

4.10.3 The Black, Scholes and Merton (BSM) probability of bankruptcy model

In this study, I provide a comparative overview of the BSM model with the other bankruptcy models because I do not have data to test the BSM bankruptcy model. The BSM default probability model has been one of the most influential and widely use default models in corporate finance. The BSM model has been used to examine *inter alia* the probability of default and recovery rates (Charitou et al., 2013), default risk returns (Hillegeist et al., 2004; Vassalou & Xing, 2004; Bharath & Shumway, 2008; Wu et al., 2010), default risk executive compensation (Jewitt et al., 2008; Kadan et al., 2017) and defaults correlations (Campbell, 2008; Chen & Hill, 2013). According to Merton (1974), equity can be viewed as a call option on the value of the assets of the firm. Equity holders are the residual claimants to the assets of the firm, and their liability is only limited when the firm is declared bankrupt. This implies that the payoff to equity holders is comparable to the payoff to call options. Additionally, under the BSM bankruptcy risk framework, the strike price of the call option is equal to the value of the firm's liabilities, with the option expiring at time T when the debt matures (Hillegeist, 2004). According to Black and Scholes (1973), an option is a security that provides the buyer with the rights to buy

or sell an asset within a specified period of time under certain conditions. An American option can be exercised at any time up to the expiry date of the option, whereas the European option can only be exercised at a specified future date (Black & Scholes, 1973). The price that is paid by the buyer for the assets when the option is exercised is called the "exercised" or "striking" price. There are two main types of options; a put option and a call option. A put option gives the owner of the assets the rights, but not the obligation, to sell an asset at a specified price (strike) and at a predetermined date (the expiry or maturity) to a given party. On the other hand, a call option is a contractual arrangement that provides the buyer with the rights, but not the obligation, to an asset or security at a specified price (strike price) within a fixed period of time. The last day at which the option may be exercised is called the expiry date (Black & Scholes, 1973). In the BSM model, Black and Scholes (1973) and Merton (1974) argue that at time T equity holders usually exercise their options and pay off their debt holders if the value of the firm's assets is greater than the face of the firm's liabilities (Hillegeist, 2004). Otherwise, equity holders will exercise their option at the expiry date when the value of the assets is not sufficient to settle the firm's liabilities (Hillegeist, 2004). The BSM model relates option pricing as a betting game where winners get their monies from losers. However, the BSM model helps equity holders/firms to predict the probability of failure. The BSM equation relates the recommended price of the option to four key factors, namely time, the price of the assets, the risk-free interest rate and the assets' volatility.

In explaining the BSM model for bankruptcy prediction, I follow the example of Hillegeist's (2004) BSM equation for valuing equity as a European call option on the value of the firm assets to show how firms value their equity using the call option (European call option). The equation makes provisions for the streams of dividends paid by the firm to equity holders.

$$V_{EQ} = V_{Ae^{-\delta T}} N(d_1) - Xe^{-rfT}N(d_2) + (1 - e^{-\delta T})V_A \qquad (1)$$

Where $N(d_1)$ and $N(d_2)$ are the standard cumulative normal of d_1 and d_2, respectively.

$$d_1 = \ln[V_A/X] + (rf - \delta + \left(\frac{\sigma^2 A}{2}\right))T \ / \ \sigma A\sqrt{T} \qquad (2)$$

And

$$d_2 = d_{1-} \ \sigma A\sqrt{T} \ = [V_A/X] + (rf - \delta + \left(\frac{\sigma^2 A}{2}\right))T \qquad (3)$$

V_{EQ} is the current market value of equity; V_A is the current market value of assets; X is the face value of debt that will mature at time T; $\ln[V_A/X]$ is the natural log of the value of assets divided by the face value of debt that will mature at time T; rf represents the compounded risk-free rate of interest; δ is the continuous dividend rate expressed in terms of the current market value of assets (V_A) and σA is the standard deviation of assets returns.

The dividend rate appears twice in equation (1) on the right hand side. The $V_{Ae^{-\delta T}}$ term explains the reduction in the value of the assets as a result of the dividend payment from the earnings reserves of the firms at time T to equity holders. $1 - e^{-\delta T}$ Shows that it is equity holders who received the dividend; if $1 - e^{-\delta T} = 0$, then it implies that no dividends were paid to the equity holders, therefore $\delta = 0$ because no dividend was paid to equity holders at time T

The probability of bankruptcy under the BSM model is the probability that the market value of assets V_A is less than the face value of the firm's debt X at time T

thus $V_A(T) < X$

$$V_A(T) < X \qquad (4)$$

The BSM operates under the assumption that the natural log of the future value of the firm assets is distributed as follows;

$$lnV_A(t) \sim N[lnV_A + (\mu - \delta - \frac{\sigma^2 A}{2}) \, t, \sigma^2 \, A^t]$$ (5)

μ is the continuously compounded expected rate of returns. As shown in equation (4), the probability of firms going bankrupt is as follows;

$$BSM\text{-}P \, (B) = N \, (\ln \, [V_A/X] + (\mu - \delta - \frac{\sigma^2 A}{2})) \, T \, / \, \sigma A \sqrt{T})$$ (6)

Equation (6) implies that with the BSM model the probability of a firm going bankrupt is a function of the difference between the current value of the firm's assets and the face value of its debt, adjusted for the expected future growth in the value of the assets of the firm $(\mu - \delta - \frac{\sigma^2 A}{2})$ (Hillegeist, 2004). It's worth maintaining that the value of the call option in equation (1) is not a function of the μ. Equation (1) assumes that all assets are expected to grow at a risk-free rate, therefore call options are assumed to have a risk-free rate.

Finally, following Bauer and Agarwal (2014), I predict that the BSM model's distance to default is calculated as a cumulative normal density.

$$Pr_{BSM} = N(-DD_{BSM}) = N - In\frac{A}{D} + (\mu - 0.5\sigma^2 A)/\sigma A \sqrt{T})$$ (7)

Where Pr_{BSM} is the probability of default using the default distance, which is a score of DD_{BSM} in a normal density function of $N \, (.)$; μ is the return expected on the assets over the forecasting period. The standard BSM model requires a simultaneous estimation of equations (6) and (3).

The assumption of a risk-free rate has been criticised by subsequent studies that argue that the probability of bankruptcy depends on several other factors, including the way and manner firms utilise and distribute their assets, which is a function of μ (Hillegeist et al., 2004; Vassalou & Xing, 2004; Bharath & Shumway, 2008; Wu et al., 2010; Chen & Hill, 2013). Further, other studies show that in a highly competitive industry, the growth and

sustainability of firms are embedded in their level of innovativeness (Becchetti & Sierra, 2003; Franzen et al., 2007; Latham & Braun, 2009) and the inimitability of their rare and valuable intangibles assets (Lee et al., 2001; Hatch & Dyer, 2004; Newbert, 2008; Lin & Wu, 2014). I contribute to the literature by combining the unique and intangible attributes, such as education, innovation intensity and elite networks with firm level accounting data to estimate the bankruptcy risk of firms. I select the traditional accounting-based bankruptcy model over the BSM model because previous studies that compare the accounting-based model to the market-based model argue that there is no significant difference between the predictive power of the Altman (1968) accounting-based bankruptcy models and the market-based bankruptcy model (Agarwal, 2008; Altman, 2017).

4.10.4 Hazard model – forecasting bankruptcy

Shumway (2001) argues that the accounting-based bankruptcy model is not a statistically significant predictor of bankruptcy as a results of the historical nature of accounting data and accounting conservatism. In the case of the market-based bankruptcy model, he argues that market-driven variables alone cannot provide significant predictions for firm bankruptcy without combining the market data with firm level data. As a result, he proposed a hybrid model that uses both accounting data and market-driven variables, called the hazard model. Shumway (1999) posits that most bankruptcy analysts chose to observe bankruptcy data ex ante. Mostly, data on healthy firms that may contribute to bankruptcy are ignored; as a result, they introduce selection bias into their forecast (Shumway, 2001). The hazard model therefore uses all available information to determine the likelihood of bankruptcy of a firm at a particular period of time. The dependent variable in the hazard model represents the time spent by a firm in the healthy group. According to the hazard model, the probability of a firm going bankrupt changes with time, and the health of a firm is a function of the age of the firm and the latest financial

data (Shumway, 2001). The major strength of the hazard model is that it incorporates time-varying co-variates, or its explanatory variables that change with time (Shumway, 2001). Further, unlike the accounting-based models, the hazard model incorporates macroeconomic variables that affect all firms within the industry at a given period of time (Shumway, 2001; Bauer, 2014). Shumway (2001) argues that the hazard model can produce more out-of-sample forecasts in comparison to the other models because it uses a binary logit measure that captures each firm year as a separate observation. In this study, I provide a comparative overview of the hazard model because I do not have data to test the model.

4.10.5 The KMV-Merton bankruptcy model

KMV Corporation, a firm specialising in credit risk database investigations and analysis, developed the KMV default probability risk model. The KMV-Merton default forecasting model applies Merton's (1974) framework in predicting the probability of a firm going bankrupt.

The KMV-Merton model estimates that the market value of a firm is assumed to be tradeable as well as follows a geometric Brownian motion such as:

$$dV_A = \mu V_{Adt} + \sigma_A V_A SV \qquad (1)$$

Where V_A is the value of the total assets of the firms, μ is the continuously compounded expected return, V_A, σ_A, is the volatility of firm value, and SV is a standard Weiner process. The second important assumption of the KMV-Merton model is that the firms issue one discounted bond that matures at time T periods. The KMV-Merton is based on a statistical probability that subtracts the face value of the firm debt from the estimated market value of the firm and then divides the results by the volatility of the firm value. The resulting Z-score, which is referred to as the distance to default, is then substituted into a

cumulative function to calculate the probability that the firm value will be less than the face value of the firm debt at a forecasting horizon.

Further, the value of the firm's equity as a function of the total value of the firm can be illustrated by the Black-Scholes-Merton formula. Thus, by put-call parity, the value of the firm's debt is equal to the value of the risk-free discount bond minus the value of the put option written on the firm with a strike price equal to the face of the firm's debt and time to maturity T. Thus, the value of equity is given by the Merton model as:

$$V_E = V_A N(d_1) - e^{-rfT} FDN(d_2) \qquad (2)$$

Where V_E is the value of the firm equity, FD is the face value of the firm's debt, rf is the instantaneous risk free rate, and N(d) is the cumulative standard normal distribution function; d_1 is given by:

$$d_1 = \ln\left(\frac{V_A}{D}\right) + (r + 0.5\sigma^2 A)T/(\sigma_{A\sqrt{T}}) \qquad (3)$$

$$d_2 = d_1 - \sigma_{A\sqrt{T}}$$

The KMV-Merton default forecasting model uses two key equations. The first is the Black-Scholes-Merton option valuation equation that expresses the value of firm equity as a function of the value of the firm. The second equation relates the volatility of the firm's value to the volatility of its equity. Under the Merton assumptions, the value of the firm equity is a function of the value of the firm and time. Therefore, following Ito's lemma I derive

$$\sigma_E = \left(\frac{V}{E}\right) \frac{\partial E}{\partial V} \sigma_V \qquad (4)$$

In the Black-Scholes-Merton model I replace $\frac{\partial E}{\partial V} = N(d_1)$ so that under the Merton model's assumptions the volatilities of the firm and their equities are related;

$$\sigma_E = \left(\frac{V}{E}\right) \frac{\partial E}{\partial V} \sigma_V \qquad\qquad\qquad (5)$$

4.10.6 Neural network bankruptcy prediction model

Studies on using neural networks for prediction bankruptcy began in 1990 and have continued until now. One of the criticisms levelled against the traditional accounting-based bankruptcy models is that the relationship effects between the financial ratios and the default prediction is saturated (Grice, 2001; Kumar, 2012; Almamy, 2016). For example, if the sales/total assets change, e.g. by 0.2 from –0.1 to 0.1, this will have a larger effect on the prediction of default compared to if the ratio changes from, e.g., 1.0 to 1.2. The neural network models have been extensively applied to an increasingly wide variety of business operations in recent years (Charitou et al., 2004). The NN model relies on a computer system that emulates the neurons (how the human brain operates) by using an algorithm to identify complex patterns and use the results to predict bankruptcy risk (Charitou et al., 2004). Empirical evidence from previous studies that employ the neural network model shows that it has a significant predictive power in comparison to the traditional accounting-based bankruptcy models (Charitou et al., 2004). However, like every any application software, the NN model is prone to security issues, such as human manipulations that can impair the results. Further, its application in the UK has thus far been very limited (Charitou et al., 2004). In this study, I provide a comparative overview of the neural network and KMV models because I do not have the data to test these models.

4.11 Theoretical framework and hypothesis development

The theoretical framework underpinning this study includes the Modigliani and Mille capital structure irrelevance theory, the trade-off theory, the agency theory, the signalling theory, the pecking order theory, the resource-based theory and the knowledge-based theory.

4.11.1 Modigliani and Mille capital structure irrelevance theory

The theory of capital structure by Modigliani and Mille (1958) implies that firms finance their assets through combinations of equity debt, or hybrid debt. The Modigliani and Mille (1958) theory states that in a perfect market the capital structure (how a firm is financed) is irrelevant to its value. The MM capital structure theory is based on the assumption of a perfect market condition, where there are no taxes, no transaction costs, no effect of debt on companies' earnings before interest and taxes, no bankruptcy cost. Most corporate transactions involve elements of borrowing cost, taxes, as well as asymmetry of market information, meaning that companies and investors have unequal access to market information. There are two key prepositions underpinning the MM capital structure irrelevance theory. The first preposition is the classic arbitrage-based irrelevance preposition, which argues that arbitrage by investors keeps the value of a firm independent of its leverage. This argument is supported by Hirshleifer (1966) and Stiglitz (1969), who argue that the value of a firm remains independent of its leverage due to arbitrage. The second preposition argues that the investment policy and the dividend pay-out policy of firms will have no effect on the stock price or the total returns of shareholders. Critics of the MM capital structure theory argue that the assumptions underlying the MM theory are unfounded. In the real world, there are taxes, transaction costs, bankruptcy costs, costs associated with different borrowing, and so on. The MM capital structure irrelevance theory implies that the type of capital structure chosen by firms is conditioned by the self-interest of directors since it has no effect on firm value. Further, access to market information will enable investors to sell their equity in a situation where firms offer them less than expected returns on their investment.

4.11.2 The static trade-off theory

According to the trade-off theory, in most situations the directors (TMT) of firms ensure that firms reach the optimal level of debt borrowing that maximises the most benefits of debt tax shields and minimises the probability of bankruptcy (Danis et al., 2014; Serrasqueiro & Caetano, 2015). One of the benefits of the use of debt is the debt tax shield. In contrast, the major disadvantage for borrowing more debt is the high interest rate and the potential financial distress (Luigi & Sorin, 2009; Leary & Roberts, 2010; Danis et al., 2014; Serrasqueiro & Caetano, 2015). The trade-off theory implies that firms have an incentive to borrow more as a result of the debt tax-shield (Serrasqueiro & Caetano, 2015). Further, the trade-off theory implies that the TMT of firms mostly evaluate the various costs and benefits associated with any investment decision and its associated leverage plan. According to the trade-off theory, most profitable firms have the capacity to borrow more for investment by taking advantage of a lower interest rate and tax savings on debt (Danis et al., 2014; Serrasqueiro & Caetano, 2015). Further, profitable firms have a lower leverage and lower probability of bankruptcy (Frank & Goyal, 2009).

However, some scholars argue that although high levels of debt borrowing provide tax benefits to firms, there is a higher probability of default among highly leveraged firms because these lose their market shares to their less leveraged counterparts during periods of economic insecurity (Opler & Titman, 1994). Consequently, most firms are reluctant to borrow more due to the likelihood of bankruptcy associated with holding higher debt (Opler & Titman, 1994). According to the trade-off theory, firms that have a greater opportunity for growth have a lower level of debt, given that greater investment opportunity increases the possibility of agency cost. Further, the trade-off theory posits that growth opportunities have no value in the case of bankrupt firms. As a result, the

costs of bankruptcy associated with debt recourse are greater in firms with high growth opportunities, As a result of the above argument,

4.11.3 Dynamic trade-off theory

The dynamic trade off theory implies that firms usually plan their working capital for a longer period of time (Luigi & Sorin, 2009; Danis et al., 2014; Serrasqueiro & Caetano, 2015). Therefore, to achieve an optimal capital structure, directors adjust their leverage ratio upward after experiencing a sequence of positive profitability shocks. Frequent re-adjustment of the proportion of debt to equity ratio over time increases the firm's tax shields and reduces its expected bankruptcy costs (Danis et al., 2014; Serrasqueiro & Caetano, 2015). The dynamic trade-off theory posits that the correct financing decision depends mostly on the financing margin anticipated by the firm in the preceding period. Some scholars argue that the debt levels in most firms differ substantially. Therefore, most firms borrow more because of transaction costs rather than for the benefit of tax savings (Luigi & Sorin, 2009; Danis et al., 2014; Serrasqueiro & Caetano, 2015). Further, they argue that the empirical studies in the dynamic trade-off literature are fairly recent, so any generalisation of empirical results should be treated with caution (Luigi & Sorin, 2009).

4.11.4 Pecking order theory

The pecking order theory posits that internal financing (retained earnings or excess liquidity, bank balance, cash etc.) is preferred to external borrowing. Hence, firms should only borrow from outside sources when their internal funds are insufficient. Thus, the order of financing under the pecking order is retained earnings, debt with no risk, short-term debt and external equity financing. This implies that highly profitable firms have a low debt ratio. Scholars who favour the pecking order theory argue that firms who finance their activities with internal funding are less likely to go bankrupt because they are mostly profitable. Highly profitable firms are mostly efficient in their operations and have the

capacity to accumulate retained earnings, so there is less need to seek external debt to finance their activities (Leary & Roberts, 2010; Serrasqueiro & Caetano, 2015). Jong et al. (2011) analysed firm leverage ratios by comparing the static trade-off theory to the pecking order theory and observed from their empirical findings that, on average, firms with low profitability and a large size are mostly inefficient and have high leverage. They argue that the pecking order theory is a better descriptor of a firm's capital structure decision compared to the static trade-off theory (De Jong et al., 2011). Following the pecking order theory and the dynamic trade off theory, I hypothesise that:

H1: There is a positive association between firm efficiency and corporate risk

To test this hypothesis, I conduct two regressions. First, I test the effects of firm efficiency on the Altman Z-score (the Altman Z-score measures financial health). Second, I test the effects of firm efficiency on the standard deviation of stock market volatility.

4.11.5 Market timing theory

The market timing theory implies that most firms issues equity at a time when they can secure the best possible price for their shares (Korajczyk et al., 1991). The idea is to take advantage of temporal fluctuations in the price of equity in the stock market. The MM (1958) theory assumes a perfect market, that is, investors have perfect information about the market, and thus firms cannot benefit from the market timing theory. However, as mentioned in the previous discussions, there is no perfect market in the real world, and as a result firm can reap some benefits under the market timing theory. In their study, which focused on the theoretical and empirical relationship between firms' capital structure and market timing theory, Baker and Wurgler (2002) argue that firms can obtain some market dividend when they issue at a time when shares prices are overvalued and repurchase shares when their price is undervalued (Baker & Wurgler, 2002). Further, some scholars argue that most firms try to time the market in order to take advantage of market

mispricing (Baker & Wurgler, 2002; DeAngelo et al., 2010; Bonaimé et al., 2014). Contrary to the above argument, some scholars argue that equity issues may rather be timed in accordance with several other market conditions, rather than just the market mispricing (Cai & Zhang, 2006; Hovakimian, 2006). The above discussions might contribute to the reason why the market-based bankruptcy models have produced mixed findings over the years. Also, top managers can have access to superior capital market information as a result of their networking relationship with other managers.

H2: There is a negative association between elite network social capital (ENSC) and corporate risk.

To test *H2,* I do two regressions. First, I test the effects of elite network social capital-Oxbridge network on the Altman Z-score (financial health). Second, I test the effects of elite network social capital-Oxbridge network on the standard deviation of stock market volatility.

4.11.6 Knowledge-based view

The knowledge-based view of the firm argues that knowledge plays a pivotal role in the resource configurations and the production processes of firms (Grant, 1996). Grant (1996) argues that the critical fundamental input in the production process and resource configuration in the firm is knowledge (Bloch, 2008; Moustaghfir, 2009; Carlucci, 2012; Swart & Kinnie, 2013; Denicolai et al., 2014). The knowledge-based theory argues that the single most important factor of production is knowledge dependent, and machines are simply an embodiment of knowledge (Grant, 1996). Further, he argues that the existence of firms represents a response to the fundamental asymmetry in economic knowledge. Unique, rare, valuable and inimitable knowledge can provide a source of competitive advantage for a firm.

4.11.7 Top management prestige view

The central tenant of the upper echelon theory is that the strategic decisions of firms are shaped by TMT attributes, such as educational background (Carpenter et al., 2004; Bhagat et al., 2010; Darmadi, 2013; Datta & Iskandar-Datta, 2014; Volonté, 2016b), qualification types (DeFond et al., 2005; Datta & Iskandar-Datta, 2014; Volonté, 2016b) and age elite network groups (Datta & Iskandar-Datta, 2014; Donnelly, 2014). For example, Datta and Datta (2014) argue that top manager's confidence and prestige such as educational credentials, university attended, experience etc. can influence their decision making and organisational outcomes. For example, Miller et al. (2014) posit that CEOs from Ivy League universities are rent-sustaining human capital resources that can lead a firm to higher corporate performance and sustained valuation. A study of 444 celebrated CEOs on the cover of major US business magazines who had graduated from elite universities (data based on the Ivy League table) showed that firms led by those CEOs reap superior rent and are more sustainable (Miller et al., 2015). Ivy League schools represent the top echelon of universities in the US. For example, universities such as Harvard, Yale, Pennsylvania and Columbia command prestige, authority and elite status in all spheres of corporate endeavour (D'Aveni, 1990; Datta & Iskandar-Datta, 2014). D'Aveni (1990) argues that failing firms' attempt to improve their managerial prestige at least three times by employing CEOs from elite university backgrounds. In furtherance to his argument, he posits that managerial prestige contributes to the legitimacy of firms by influencing social exchanges at three levels: the individual customer level, the inter-organisational transaction level and the societal level. In relation to the individual customer level, prestige promotes an illusion of competence and control and enhances customers' trust in the firm, thus CEOs from elite university backgrounds signal competence, credibility and trustworthiness. At the inter-organisational transaction level, CEOs from elite university backgrounds are mostly visualised by their counterparts from less elite university backgrounds as being individuals with outstanding academic abilities

and intelligence (Datta & Iskandar-Datta, 2014). Usually, an individual must show exceptional academic talent and intelligence before they are admitted to the top elite universities in the UK and the US. Therefore, it is clearly discernible that there are superior human resources from top elite institutions who can contribute significantly to a firm's strategic decision making and survival (D'Aveni, 1990; Lee & Brinton, 1996; Datta & Iskandar-Datta, 2014). Further, D'Aveni (1990) argues that CEOs from elite university backgrounds usually have access to superior information and resources for strategic decsion making from a broader network of ties, including political, economic and social ties. Therefore, to be able to benefit from these broader political, economic and social ties, failing firms try to employ CEOs from elite university backrounds who are well connected to these network groups to reap superior rent for the firm (D'Aveni, 1990; Datta & Iskandar-Datta, 2014).

4.11.8 Industry effects on bankruptcy risk prediction

Most of the bankruptcy prediction models in the extant accounting and finance literature have failed to include industry effects in their models for predicting bankruptcy risk (Chava & Jarrow, 2004). Industry effects play a prominent role in bankruptcy risk prediction for two main reasons. The first is the different levels of regulatory and economic challenges, including environmental regulations, tax laws and government regulations, different industries face different levels of competition, technological challenges, market restrictions, and so on. Second, different industries may have different accounting conventions, different operational and financial risks, and so on. Therefore, the probability of bankruptcy may differ across different industry sectors. I control for the industry effect in my analysis by using the Bloomberg four digit industry sector codes in my data.

4.11.9 Effective corporate governance and bankruptcy risk

The resource-based view and the knowledge-based view theories of the firm imply that the rare, valuable and idiosyncratic leadership (TMT) resources of firms are crucial for the growth, success and survival of most firms (Wernerfelt, 1995a; Barney et al., 2001; Kunc & Morecroft, 2010). In furtherance to this argument, the top echelon theory posits that the strategic decisions of most firms are influenced by the individual managerial attributes of the TMTs of firms. Such managerial attributes include their educational background, their experience and their network groups. Previous studies show that one major characteristic of most distressed firms is poor corporate governance (Fich & Slezak, 2008). Most existing methods for predicting bankruptcy risk have mainly relied on financial and accounting data, with little or no consideration to key managerial attributes that influence the strategic decisions of firms. This study contributes to the accounting and finance literature by combining managerial attributes, accounting data and market/finance data all in one study to predict bankruptcy risk. Corporate governance can have three potential effects on the probability of bankruptcy. First, the recent global financial crisis, which involved high level corporate scandals such as WorldCom and Enron, provided obvious evidence that financial and accounting data are not adequate in predicting bankruptcy (Fich & Slezak, 2008). Studies show that the main cause of the global economic meltdown that led to the collapse of some of the biggest corporate entities in the world was the result of poor corporate governance (Coffee Jr, 2003; Acharya & Richardson, 2009; Christopoulos et al., 2011). Corporate governance can have three major influences on bankruptcy risk prediction. First, the collapse of major corporate entities such as Enron and WorldCom provides clear evidence that financial and accounting data can be manipulated to obscure the financial health of firms. Thus, the accounting and finance data in this instance failed to predict the bankruptcy risk. Second, the governance structure of firms represents a nexus of incentive contracts; these contracts (executive compensations and bonuses) can influence the commitments of a

TMT's response to bankruptcy risk (Fich & Slezak, 2008). I extend the literature on bankruptcy risk prediction by including executive compensation in my models. Third, the upper echelon theory implies that managerial strategies and decisions in managing all forms of risk, including bankruptcy risk, are conditioned by their individual attributes including their experience and qualifications. For example, a firm that has accounting certified financial experts on their audit committee may be effective in monitoring managerial fraud and resource misapplications. Previous studies show that there is a negative association between accounting certified financial experts and earnings management (Klein, 2002; Badolato et al., 2014a; Kusnadi et al., 2016) I show that the combinations of managerial attributes with the accounting-based bankruptcy model will increase the predictive powers of bankruptcy models.

4.12 Empirical constructs

4.12.1 Research and development intensity

The knowledge-based theory of the firm implies that a competitive advantage can be secured when a firm has access to rare, valuable, unique and inimitable resource capabilities. In this knowledge-driven and highly competitive business world, companies have resorted to R&D intensity to secure or increase their market share (Yeh et al., 2010). Following Yeh et al. (2010), I measure TMT innovativeness by finding the natural log of R&D expenditure. Previous studies show that R&D expenditure has some negative association with the financial health of the company (Yeh et al., 2010; Falk, 2012); however, in the long term R&D expenditure generally increases corporate financial performance in the long-term (Connolly & Hirschey, 2005; Artz et al., 2010; Yeh et al., 2010; Pandit et al., 2011) and consequently increases firm value. In furtherance to this argument, Hartmann et al. (2006) state that increased investment in R&D does not always guarantee positive returns to the organisation; there must be some cut-off point beyond which R&D investment will bring some diminishing or negative returns to the

organisation. From the perspective of the knowledge-based theory, about fifty percent of R&D expenditure constitutes wages and salaries paid to well-trained and highly educated employees for their "tacit knowledge" (Hall & Lerner, 2010). Previous research on R&D posit that argue that R&D may have a negative effect on the profitability and liquidity (financial health) of the firm in the short term because return on investment rarely occurs during the period in which the innovation investment takes place (Lin, 2006; Franzen, 2007; Eisdorfer, 2011; Alessandri, 2014). This implies that at R&D intensity may have a negative association with financial health in the short term at firm level.

However, in the long term the efficiency of operations (due to the acquisition of higher skills and experience through repeated practice) will reduce operational cost and increase returns from investment, which will increase firm value (Connolly & Hirschey, 2005; Hall & Lerner, 2010; Yeh et al., 2010). The aforementioned discussions lead us to the third hypothesis that;

H3a: The impact of R&D on corporate risk is positive for firms with TMTs that have an elite educational background.

H3b: The impact of R&D on corporate risk is positive for firms with TMTs that have industry specific experience.

H3c: The impact of R&D on corporate risk is positive for firms with TMTs that have industry accounting certified finance expertise.

I do two regressions to test this hypothesis. First, I examine the effects of the interactive term between R&D and elite network social capital (ENSC) on the Altman Z-score (financial health). Second, I examine the effects of the interactive term between R&D and ENSC on the standard deviation of stock market return volatility

4.12.2 Elite network social capital-Oxbridge network

The upper echelon theory posits that organisational outcomes are mostly influenced by the TMT managerial attributes, such as their educational background (Carpenter et al., 2004; Bhagat et al., 2010; Datta & Iskandar-Datta, 2014). Following D'Aveni (1990), I classify TMTs who attended Oxford or Cambridge (elite network social capital-Oxbridge) as being part of an elite network. Thus, a TMT attending an elite network social capital-Oxbridge equals 1 and otherwise 0. According to D'Aveni (1990), TMTs from elite university backgrounds can contribute positively to organisational survival due to the respect and prestige accorded to them by lenders. Managerial prestige provides legitimacy to firms by influencing economic and social exchanges (D'Aveni, 1990). Bankruptcy implies the demise of the management legitimacy to govern the firm. Managerial prestige usually creates some degree of faith and trust amongst creditors of the firm (D'Aveni, 1990). According to the status characteristics theory, the demographic background of mangers, such as having graduated from Cambridge or Oxford, indicates higher status (Hembroff & Myers, 1984). Further, high status individuals are less likely to be punished at each stage of the attribution process (D'Aveni, 1990). For example, lenders perceive high status individuals to be experts (D'Aveni, 1990; Lee & Brinton, 1996) with a high level of experience (Hembroff & Myers, 1984; D'Aveni, 1990; Lee & Brinton, 1996). D'Aveni (1990) posits that most US firms which have a higher probability of going bankrupt usually appoint CEOs from elite university backgrounds to save the firms from bankruptcy because the market reacts positively following the appointment. Most markets react positively towards the appointment of a higher status CEO (Schmid & Dauth, 2014; Nguyen et al., 2015). This perception may reduce the cost of capital and the perceived risk of default (Hembroff & Myers, 1984; D'Aveni, 1990; Lee & Brinton, 1996). The above discussions lead us to my hypothesis that;

H4: Firms that employ TMTs who belong to elite network such as Oxford and Cambridge have lower risk compared to their counterparts.

4.12.3 Elite network social capital – elite universities

Previous studies show that over 55% of CEOs of the FTSE 350 are foreigners who graduated from elite universities around the world (Milburn, 2014; Kirby, 2016). Therefore, following D'Aveni (1990) I measure elite university by distinguishing between TMTs who attended the top 100 universities (according to The Times higher education World University ranking 2016). Consistent with D'Aveni, (1990), I control for different levels of qualifications, and I use a scale of 0-7 for each manger's educational history, whereby 0 equals college dropout, 1 equals an undergraduate degree at a non-elite college or university and 7 equals a PhD at an elite university. Examples of these elite universities include California Institute of Technology, Stanford University, Columbia University, Harvard, Yale, University of Pennsylvania and Brown University. These universities have connotations of social elitism and academic excellence. The admissions process to these universities is very rigorous with a minimum highest possible SAT and GMAT scores or mostly a minimum A level grades of 3 A* A* A* or 2 A* A* and A (D'Aveni, 1990; Milburn, 2014; Zimmerman, 2016). Zimmerman (2016), argues that admission to an elite high school provides the upper class with a gateway to occupy the top echelons in most global firms. In furtherance to this argument, Milburn and Alan (2014), argue that admission to most elite universities promotes a widening of the income gap and social inequalities among communities across the world. In order to maintain the status quo and enjoy the prestige that comes with this status, TMTs network with each other to help their colleagues out of trouble (D'Aveni, 1990; Milburn, 2014; Zimmerman, 2016). Therefore, I hypothesise that;

H5: Firms that employ TMTs who belong to the global elite network (top 100 universities in the world) have lower risk compared to their counterparts.

I do two regressions to test this hypothesis. First, I examine the effects of TMTs that belong to the global elite network on financial health. Second, I examine the effects of TMTs that belong to the global elite network on the standard deviation of the stock market returns volatility.

Following D'Aveni (1990), I use The Times world university ranking (THES) database 2015/2016, shown below in table 4.3, to determine if a TMT was educated at one of the top 100 univesities in the world. I assign 1 if the TMT attended one of the top 100 universities, and otherwise 0.

Table 4. 3 Top 100 best universities in the world by THE ranking 2017

Institution	Country	World Rank	Country Rank
Harvard University	USA	1	1
Stanford University	USA	2	2
Massachusetts Institute of Technology (MIT)	USA	3	3
University of California, Berkeley	USA	4	4
University of Cambridge	UK	5	1
Princeton University	USA	6	5
California Institute of Technology	USA	7	6
Columbia University	USA	8	7
University of Chicago	USA	9	8
University of Oxford	UK	10	2
Yale University	USA	11	9
University of California, Los Angeles	USA	12	10
Cornell University	USA	13	11
University of California, San Diego	USA	14	12
University of Washington	USA	15	13
Johns Hopkins University	USA	16	14
University of Pennsylvania	USA	17	15
University of California, San Francisco	USA	18	16
University College London	UK	18	3
Swiss Federal Institute of Technology Zurich	Switzerland	20	1
The University of Tokyo	Japan	21	1
University of Michigan-Ann Arbor	USA	22	17
The Imperial College of Science, Technology and Medicine	UK	23	4
University of Wisconsin - Madison	USA	24	18
University of Toronto	Canada	25	1
Kyoto University	Japan	26	2
New York University	USA	27	19
Northwestern University	USA	27	19
University of Illinois at Urbana-Champaign	USA	29	21
University of Minnesota, Twin Cities	USA	30	22
Duke University	USA	31	23
Washington University in St. Louis	USA	32	24
Rockefeller University	USA	33	25
University of Colorado at Boulder	USA	34	26

Institution	Country	World Rank	Country Rank
University of Copenhagen	Denmark	35	1
Pierre and Marie Curie University - Paris 6	France	36	1
The University of Texas at Austin	USA	37	27
University of California, Santa Barbara	USA	38	28
University of North Carolina at Chapel Hill	USA	39	29
University of British Columbia	Canada	40	2
University of Paris-Sud (Paris 11)	France	41	2
The University of Manchester	UK	41	5
University of Maryland, College Park	USA	43	30
The University of Melbourne	Australia	44	1
The University of Texas Southwestern Medical Center at Dallas	USA	44	31
Heidelberg University	Germany	46	1
The University of Edinburgh	UK	47	6
Karolinska Institute	Sweden	48	1
University of Southern California	USA	49	32
University of California, Irvine	USA	50	33
Technical University Munich	Germany	51	2
University of Munich	Germany	52	3
Vanderbilt University	USA	53	34
University of Zurich	Switzerland	54	2
King's College London	UK	55	7
Utrecht University	Netherlands	56	1
University of California, Davis	USA	57	35
University of Oslo	Norway	58	1
University of Geneva	Switzerland	58	3
Pennsylvania State University - University Park	USA	60	36
Uppsala University	Sweden	61	2
Carnegie Mellon University	USA	61	37
Purdue University - West Lafayette	USA	61	37
McGill University	Canada	64	3
Rutgers, The State University of New Jersey - New Brunswick	USA	64	39
University of Bristol	UK	66	8
University of Helsinki	Finland	67	1
The Hebrew University of Jerusalem	Israel	67	1
The Ohio State University - Columbus	USA	67	40

4.12.4 Educational background of directors

The extant upper echelon literature posit that that TMT educational background can influence their dominant logic (Kor 2013) and firm outcomes (Hambrick 1984). Previous empirical studies show that about 72% of CEOs in the FTSE 350 have undergraduate/postgraduate qualifications in either the humanities or business management (Davis, 2017). Some scholars argue that the type of qualification (academic or professional) that the CEO holds can influence a firm's R&D expenditure (Barker III & Mueller, 2002). Further, according to Bhagat et al. (2010), a CEO's academic education may influence their decision making in three ways. First, an academic education broadens the cognitive abilities of a CEO by providing them with reasoning skills, communication skills, problem solving skills, and so on (Gottesman & Morey, 2006; Bhagat et al., 2010; Darmadi, 2013). Second, psychologists argue that the several years of writing in formal education and its associated exams prepare the individual to be accommodating, persevering and able to perform under pressure. Further, Gottesman and Morey (2006) argue that academic education may be a proxy for intelligence. Previous studies posit that formal education has no significant association with R&D spending (Barker III & Mueller, 2002). However, TMT's with advance science related degrees are more supportive of R&D spending (Barker III & Mueller, 2002). Franzen et al (2007) posit that, firms that invest more in R&D are more competitive and have less bankruptcy probability. This lead us to my next hypothesis that;

H6: The impact of TMT education level on corporate risk is negative when TMT innovativeness increases.

I do two regressions to test this hypothesis. First, I use the Altman Z-score as my dependent variable. Second, I use the standard deviation of stock market returns volatility as my dependent variable.

Further, Previous studies compare different bankruptcy model have produced mixed results regarding which model have the highest bankruptcy prediction power (Hillegeist, 2004; Wu, 2010; Kumar, 2012; Almamy, 2016). Following the upper echelon theory, I argue that firm's outcomes is a reflection of their TMT attributes. Therefore combinations of managerial attributes with firm level data and market level data can provide a better bankruptcy probability prediction. This led us to my next hypothesis that state that;

H7: The combinations of managerial attributes data with the traditional accounting-based model and the stock market return volatility model increase corporate risk predictive significance.

4.12.5 Industry-specific experience

The knowledge-based theory of the firm implies that the TMT brings to the firm a plethora of valuable, rare, inimitable and idiosyncratic skills and expertise that have been acquired through years of experience. Further, managerial industry-specific experience enables firms to benefit from industry opportunities, competitive conditions and new technologies. Kor (2008) argues that industry-specific experience broadens the strategic perspective of individuals for effective decision making.

4.12.6 Altman Z-score

Following Altman (2017), I use financial health (Z-score) to measure the probability of firms going bankrupt. Even though the Z-score model was developed over four decades

ago, it remains a popular model for bankruptcy or financial distress prediction (Altman, 2017). Altman (2017) posits that the Z-score performs better than other bankruptcy risk models when country-specific estimations that incorporate multiple variables are incorporated into the model. Further, according to Agarwal and Taffler (2008), the difference between the predictive accuracy of the Altman Z-score and the other bankruptcy risk models is negligible. Using accounting information derived from financial statements, Altman (1968) classified financial health into a standard ratio types such as Liquidity ratios, profitability ratios, leverage ratios, solvency and activity ratios.

$$Z = 0.012. X_1 + 0.014. X_1 + 0.033 X_1 + 0.006 X_1 + 0.0999 X_1$$

Where X_1 is the working capital/total assets, X_2 is retained earnings/total assets, X_3 is earnings before interest and tax/total assets, X_4 is market value of equity/book value of total liabilities, X_5 is sales/total assets, and Z is the overall index. Altman (2017) intimates that the Z-score model is intended for firms listed on the stock exchange. Further, the use of the Z-score in combination with other data such as managerial attributes can enhance its predictive powers. For example, Tinco and Wilson (2013) combined the Z-score with macroeconomic variables to assess the performance of UK listed companies.

4.12.7 Standard deviation of stock market return volatility

I use the standard deviation of stock market return volatility to measure corporate bankruptcy risk. Volatility measures the amount of risk or uncertainty of returns for a specified security. I use the standard deviation of firm returns to measure risk of bankruptcy following (Mun, 2013) functions of moments. These functions of moments involve four levels of statistical applications of measuring firm returns volatility.

In the first moment, I find the mean value of the firm return;

$$\bar{x} = \frac{\sum_{i=1}^{n} r_{i,\tau}}{n} \qquad (1)$$

Where $\sum_{i=1}^{n} r_{i,\tau}$ is the summation of firm natural logarithm of market returns in my sample and n is the total number of observations that are non-missing.

In the second moment, I calculated for the amount variability or dispersion around the mean value in equation (1), calculating for the square of the variance. Therefore, I estimate firm market returns *i's* volatility during month *t* as the standard deviation of firm's daily returns during month *t*.

$$VOL_{i,t} = \sqrt{\frac{\sum_{\tau \varepsilon t}(r_{i,\tau} - \overline{r_{i,t}})^2}{n_t - 1}} \qquad (2)$$

Where $r_{i,\tau}$ is the natural logarithm of day $\tau \varepsilon t$ gross excess return on firm *i's* stock $\overline{r_{i,t}}$ is the mean of the logarithms of gross daily returns on firm *i's* stock during month *t*, and n_t is the number of observations that are non-missing during month *t*.

In the third moment, I calculate for the skewness, which measures the asymmetry of the distribution of real and random values in my data around the mean returns. This provides us with the extent of bankruptcy risk (distance away from the mean firm returns).

$$skewness = \frac{n}{(n-1)(n-2)} \sum_{i=1}^{n} \left[\frac{r_{i,\tau} - \overline{r_{i,t}}}{s}\right]^3 \qquad (3)$$

Mun (2013) argues that the measure of volatility of a firm's returns by standard deviation is the most popular measure of risk because it provides a measure of each data point away from the mean firm return. Previous studies show that there is a positive association

between firm-level returns and firm-level volatility (Grullon et al., 2012). Further, these positive associations may be accounted for by the real option that the firm has put in place (Grullon et al., 2012).

4.12.8 Firm age

The actual age of the firm does not matter; rather, how well the firm's resources and capabilities have been used to meet the challenges of its competitive environment is important (Thornhill & Amit, 2003). Firms go through different phases of development and growth at different stages in their lifecycle. Young firms usually work hard to develop a competitive advantage over their rivals or strive to develop capabilities to enable them to survive beyond adolescence (Thornhill & Amit, 2003). In contrast, older firms strive to maintain their market share or explore alternative markets and technologies to increase product portfolios. Previous studies posit that it is the dynamic capabilities of firms that enable them to survive the competition as they age (Dunne & Hughes, 1994; Thornhill & Amit, 2003). Some scholars argue that inadequate resources and a lack of dynamic capabilities can lead to the early mortality of younger firms (Dunne & Hughes, 1994; Thornhill & Amit, 2003). Further, Thornhill and Amit (2003) posit that a mismatch between resources and dynamic capabilities coupled with non-viable business models can lead to bankruptcy.

4.12.9 Firm size

According to the resource-based view of the firm, the larger resource bases of bigger firms can provide them with a competitive advantage (Wernerfelt, 1995a; Vicente-Lorente, 2001; Ndofor et al., 2011). Larger firms usually have better access to resources, including skilled manpower, easier access to funds (debt and equity) and easier access to technology, and they are also less likely to go bankrupt (Doğan, 2013). Further, Altman (2017) posits that the size of a firm is an important factor that can influence the probability of bankruptcy risk. Therefore, following Doğan (2013), I measure firm size by the natural

logarithm of total assets. Previous studies show that big firms usually require higher capital outlay and more resources (Doğan, 2013). Further, such firms tend to control higher market shares (Akbas & Karaduman, 2012; Doğan, 2013) and higher profit (Akbas & Karaduman, 2012) and are more likely to avoid bankruptcy risk in comparison to smaller firms (Dunne & Hughes, 1994; Dawley et al., 2003; Beaver, 2005). In furtherance to this argument, Dunne and Hughess' (1994) survey of over 2000 UK companies from the period of 1975 to 1985 showed that smaller companies are more susceptible to bankruptcy risk compared to the larger companies.

To obtain an unbiased estimate of a causal effect in My multiple regression, I control for accounting variables including firm profitability, firm liquidity, current ratio and cash ratio because these variables constitute the key accounting ratios that most firms use to measure their financial health. Further, I control for age of firm and firm size. Table 4.4 below provides variables descriptions for the models.

Table 4. 4 Variables descriptions

Indicators and constructs	Definition
Z-score (Financial health)	Proxy for financial health. Altman's (1968) Z-score is calculated as follows: [Z= 3.3*(EBIT/Tangible assets) +0.6*(Market value of equity/total liabilities) +1*(Sales/tangible assets) +1.2*(Working capital/tangible assets) +1.4*(retained earnings/tangible assets)]. (Source: Bloomberg)
Bankruptcy risk	Standard deviation of stock market return volatility (source authors construction)
Tobin's Q	The ratio of the market value of firm to the replacement value of the firm's assets. (Source: Bloomberg)
Elite network social capital-Oxbridge	Dummy variable: 1, if TMT have degrees from the University of Oxford or University of Cambridge; 0, otherwise. (Source: authors' own construction)
Accounting Finance Expert	Dummy variable: 1, TMT is ACCA, CPA, ICAEW, CIMA, CFA or other certified accounting qualifications otherwise 0.
Sustainability disclosure CSD	A score based on the extent of company's Growth, Environment, Social and Governance disclosure (Source Bloomberg)
Industry-specific experience	Dummy variable: 1, if TMT have expertise in the industry that their firm is operating; 0, otherwise. (Source: authors' own construction)
Supervisory experience	Dummy variable: 1, if TMT have previous experience as chief executive officer (CEO), chief finance officer (CFO), chief operating officer (COO), vice president, managing director or chairman; 0, otherwise. (Source: authors' own construction)
TMT experience	Proxy for TMT experience as a latent construct, which is the linear combination of the indicators *Firm-specific experience, Industry-specific experience* and *Supervisory experience*. (Source: authors' own construction)
Firm age	The number of years since the inception of the firm as of the corresponding year in the panel. (Source: Bloomberg)
Firm size	Firm size is measured by natural logarithm of total assets
Return on assets	ROA. Net income over total assets. (Source: Bloomberg)
Return on equity	ROE. Net income over equity capital. (Source: Bloomberg)
Cash ratio	The ratio of cash and near cash items plus marketable securities & other short term investments to current liabilities. (Source: Bloomberg)
Current ratio	The ratio of current assets to current liabilities. (Source: Bloomberg)
Quick ratio	The ratio of current assets less inventories to current liabilities. (Source: Bloomberg)
Debt to equity	The ratio of total debt to total book value of equity. (Source: Bloomberg)
Debt to assets	The ratio of total debt to total assets. (Source: Bloomberg)
Assets turnover	Total sales revenues divided by total assets. (Source: Bloomberg)
Sales to assets	Total sales revenues divided by net assets. (Source: Bloomberg)
Executive Compensation	Logarithm of total executive compensation (salaries and wages, bonuses etc.)
Efficiency	Proxy for efficiency of corporate operations as a latent construct, which is the interaction term of *Assets turnover* X *Sales to assets*.
Elite network social capital	Dummy variable: 1, if TMT graduated from the top 100 higher education institutions according to the ranking provided by The Times Higher Education in 2016; 0, otherwise]. (Source: authors' own construction)
Academic education	Categorical variable: 1 if TMT have graduate degrees; 2 if postgraduate degrees; 3 if PhD degrees; 0, otherwise.
TMT innovativeness	TMT innovativeness is measure by R&D intensity. Thus *R&D to sales*, which is the ratio of R&D expenditure to total sales. (Source: Bloomberg)

4.13   Methodology

4.13.1   Data section

My dataset consists of the 350 FTSE UK companies that have accounting, finance and corporate governance information in the Bloomberg DataStream. I rely mainly on the Bloomberg DataStream for two key reasons. First, to ensure consistency in my data because different DataStream sets use different computations for different variables. Second, most of my firm level data (accounting and finance data) are available on the Bloomberg DataStream. My original sample contained 16,730 company year observations comprising data on 3,450 financial statements and 13,280 handpicked data about board of directors for each of the companies in the UK FTSE 350 companies from 2007 to 2016. For each director on the board, I painstakingly collected data about their educational background (qualifications), experience, higher education institution attended, etc. I further decompose education into academic education and professional education. Following Defond (2005), I categorize information about audit committee into accounting certified financial experts, non-accounting certified financial experts, and supervisory experts. I further decompose experience into general experience, industry-specific experience and firm-specific experience. Regarding higher educational institution attended, following D'Aveni (1990) I use the Time world university ranking to categorise the institutions into elite and non-elite; elite equals 1 if a manger attended one of the top 100 universities in the world, and 0 otherwise (non-elite). Further, if a director attended Oxford or Cambridge (elite network social capital-Oxbridge) this equals 1, and 0 otherwise. After deleting duplicate data and removing missing data, I arrive at 250 FTSE firms. Table 4.5 and 4.6 presents the summary statistics and correlation matrix respectively for this study.

Table 4. 5 Descriptive statistics

Variable	N	Mean	Standard deviation	Minimum	Maximum	Percentiles 25%	Percentiles 50%	Percentiles 75%
Z-Score	2011	4.212	4.844	-2.953	5.832	2.250	3.530	5.579
Corporate bankruptcy Risk	2407	0.049	0.106	0.000	3.194	0.012	0.025	0.055
Tobin's Q	2257	1.930	2.949	0.453	80.938	1.062	1.430	2.094
TMT innovativeness	1760	0.034	0.691	0.001	0.045	0.024	0.032	0.045
Elite network social capital-Oxbridge	2790	0.190	0.393	0.000	1.000	0.000	0.000	0.000
Accounting Finance Expert	2804	0.886	0.318	0.000	1.000	1.000	1.000	1.000
Academic Education	2425	1.817	0.620	0.693	3.000	1.386	1.792	2.079
Industry specific Experience	2668.	0.692	0.663	0.000	1.000	1.000	1.000	1.000
Elite network social capital-Global	2795	0.413	0.175	0.000	1.000	0.000	1.000	1.000
Corporate sustainability disclosure	1905	0.153	0.123	0.214	0.783	0.040	0.185	0.585
Firm Size (Ln)	2606	8.050	1.852	1.838	14.73	6.868	7.752	8.913
Age of firm (Ln)	2369	0.962	0.546	4.519	4.174	0.839	1.092	1.325
Debt to equity ratio	2212	0.372	0.386	0.086	0.290	0.045	0.386	0.679
ROA	2492	0.062	0.123	-0.739	2.355	0.005	0.052	0.092
ROE	2371	0.179	0.723	-1.360	24.099	0.012	0.124	0.219
Executive Compensation	2032	13.722	0.547	12.339	15.151	13.33	13.69	14.09
Efficiency Ratio	2579	0.837	0.725	0.433	0.680	0.319	0.677	0.752
Cash ratio	2183	0.835	4.384	0.001	53.750	0.143	0.282	0.543
Current ratio	2019	1.951	4.742	0.030	61.978	0.888	1.292	1.804
Quick ratio	2128	1.238	4.486	0.001	54.750	0.402	0.679	1.061

Table 4. 6 Correlation matrix

	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Z-Score	5.212	9.844								
R&D intensity	0.064	0.786	0.164**							
Oxbridge	0.190	0.393	0.016	0.095**						
Accounting Finance Expert	0.886	0.318	0.046*	0.093**	0.004					
Education	1.817	0.620	0.052*	0.117**	-0.180**	-0.071**				
Indus. Specific Experience	1.692	0.663	-0.004	-0.066**	-0.071**	0.005	0.095**			
Elite University Network	0.411	0.275	0.004	0.075**	0.215**	-0.074**	0.351**	-0.020*		
Tobin's Q	1.930	2.949	0.186**	0.087**	0.090**	0.002	-0.087**	0.007	0.003	
Return volatility (SD)	0.049	0.106	0.008	0.003	0.108**	-0.014	-0.027*	0.029*	0.031*	0.073**
Total assets (Ln)	8.050	1.852	-0.162**	-0.059*	0.049*	-0.075**	0.064**	-0.055**	0.190**	-0.238**
Firm Age (Ln)	0.962	0.546	-0.057**	-0.004	0.044*	0.000	0.049*	-0.006	-0.011	-0.086**
Debt to Equity ratio	1.076	3.386	-0.022*	-0.013	-0.008	0.037*	0.012	0.001	-0.021*	-0.002
Current ratio	1.951	4.742	0.796**	0.170**	-0.053*	0.053*	0.117**	0.001	0.004	-0.011
Cash ratio	1.238	4.486	0.818**	0.186**	-0.038*	0.064**	0.126**	-0.012	0.022*	0.000
Corp. Sust Disclosure	10.293	12.303	0.134**	-0.006	0.074**	-0.009	-0.037*	-0.035*	0.006	0.817**
Efficiency ratio	0.837	0.725	0.011	-0.173**	-0.017	-0.044*	-0.205**	0.015	-0.101**	0.246**
Executive Compensation (Ln)	13.722	0.547	-0.084**	-0.026*	0.015	-0.080**	0.035*	-0.030*	0.114**	-0.032*
ROA	0.062	0.123	0.113**	0.073**	-0.004	-0.016	-0.073**	0.056**	-0.070**	0.589**
ROE	0.179	0.723	0.019	0.010	-0.035*	0.018	-0.055*	-0.027*	-0.022*	0.419**

Variable	Mean	SD	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Return Volatility (SD)	0.049	0.106										
Total assets (Ln)	8.050	1.852	0.062**									
Firm Age (Ln)	0.962	0.546	0.073**	0.192**								
Debt to Equity ratio	1.076	3.386	-0.001	-0.014	-0.027*							
Current ratio	1.951	4.742	-0.023*	-0.125**	-0.033*	-0.010						
Cash ratio	1.238	4.486	-0.026*	-0.125**	-.0047*	-0.009	0.945**					
Corp Sust. Disclosure	10.293	12.303	0.054*	-0.137**	-0.031*	0.187**	-0.013	-0.003				
Efficiency ratio	0.837	0.725	0.004	-0.338**	0.037*	-0.015	-0.136**	-0.120**	0.212**			
Exec. Comp. (Ln)	13.722	0.547	0.096**	0.440**	0.125**	0.008	-0.107**	-0.103**	-0.012	-0.082**		
ROA	0.062	0.123	0.103**	-0.307**	-0.039*	-0.010	0.024*	0.015	0.460**	0.216**	0.005	
ROE	0.179	0.723	0.040*	-0.158**	-0.021*	-0.002	-0.060**	-0.050*	0.704**	0.237**	0.059**	0.711**

4.14 Analysis of results and discussions

In order to assess the statistical significance and the explanatory power of the variables in my models, I performed a series of regression analyses, including pooled OLS fixed effects (corrected by robust standard errors) on my firm level variables and managerial level variables. Further, following Campbell et al. (2008). I used Tobit regression analysis for my market based bankruptcy model due to the volatility of the market returns. However, I notice that my results were almost similar to the fixed effect OLS results.

Table 4.7 reports my random effects and fixed effects regressions results, whereas Table 4.8 reports my lagged pooled OLS (robust) and the lagged fixed effects robust results. Thus, models 1-5 report pooled OLS regression results and in 1*- 5* I controlled for indigeneity by lagging the fixed effects of my models 1-5. In model 1 I show the effect of the combination of the traditional accounting-based bankruptcy model and corporate governance attributes (managerial attributes) on financial health (Z-score). Consistent with the results from My Hausman test, I only discuss the fixed effects (robust) results in Table 4.7 and the lagged fixed effects (robust) results in Table 4.8. To distinguish my fixed effect robust results from the random effects, I denote my fixed effects results with a star (*). For example model 1* refers to the fixed effect robust regression results for model 1.

Model (1*) in model 1* I show the fixed effects of the combination of the traditional accounting-based bankruptcy model and elite network social capital-Oxbridge on financial health (Z-score). In My model I include elite network social capital-Oxbridge with accounting data but exclude innovation and academic education. My results indicate that there is a significant positive association between elite network social capital-Oxbridge and financial health ($\beta = 1.023$, $p = 0.003$). This result is consistent with

previous studies that posit that CEOs from an elite university background are viewed by both investors and lenders as being more competent and trustworthy (D'Aveni, 1990; Lee & Brinton, 1996; Datta & Iskandar-Datta, 2014). Therefore, they are more likely to have access to cheaper capital. Further, there is a significant positive association between market value and financial health ($\beta = 1.467$, $p = 0.000$), efficiency and financial health ($\beta = 1.006$, $p = 0.014$), a positive association between ROA and financial health ($\beta = 0.0587$, $p = 0.022$), and a significant positive association between current ratio and financial health ($\beta = 0.174$, $p = 0.052$). My results in model 1* imply that highly liquid and efficient firms have a lower probability of bankruptcy. Further, highly liquid and efficient firms have a higher market value. This result is consistent with my hypothesis 1, which implies that very efficient firms have less bankruptcy probability because of their stronger financial health and high firm value.

Model (2*) in model 2* I show the effects of the combination of innovation and accounting data on financial health. Therefore, I include in my model accounting data with innovation and exclude academic education and elite network social capital-Oxbridge. My results indicate that there is an insignificant negative association between innovativeness and financial health ($\beta = -0.013$, $p = 0.363$). This results implies that R&D expenditure may have a negative effect on a firm's financial health in the short term. However, in the long term, R&D expenditure can impact on financial health and firm value, especially when R&D projects start yielding positive cash flows to the firm (Lin, 2006; Franzen, 2007). This result is consistent with previous studies that posit that R&D expenditure has a negative association with bankruptcy risk in the long term (Lin, 2006; Franzen, 2007). Further, my results show that there is a significant positive association between market value and financial health ($\beta = 1.472$, $p = 0.000$), between efficiency and financial health ($\beta = 0.957$, $p = 0.001$), a positive association between ROA and financial health ($\beta = 0.0583$, $p = 0.022$), and a significant positive association between current ratio

and financial health ($\beta = 0.171$, $p = 0.054$). My results in model 2* show that highly liquid and efficient firms have a lower probability of bankruptcy. Further, R&D intensity, which represents TMT innovativeness, can increase cost and lower financial health in the short term.

Model (3*) in model 3* I show the effects of the combination of innovation and education on financial health. I include in my model accounting data with innovation and education and exclude elite network social capital-Oxbridge. My results indicate that a combination of a high level of academic education and innovativeness can result in a positive effect on financial health ($\beta = 0.130$, $p = 0.073$). My results imply that a firm that have highly qualified academics as TMTs who promote R&D initiatives can result in a better financial performance. Consistent with my previous results in models 2 and 3, I notice a significant positive association between market value and financial health ($\beta = 1.548$, $p = 0.000$), efficiency and financial health ($\beta = 0.937$, $p = 0.004$), a positive association between ROA and financial health ($\beta = 0.0601$, $p = 0.017$), and a significant positive association between current ratio and financial health ($\beta = 0.169$, $p = 0.059$). My results in model 3 show that highly liquid and efficient firms have a lower probability of bankruptcy. My observation extends the accounting literature by confirming hypothesis three, which implies that highly qualified academics who promote R&D activities in their firms can be a valuable asset to the firm, especially during periods when firms are experiencing a higher probability of bankruptcy risk. As a result, I am unable to reject hypothesis three, which states that there is a positive association between financial health and innovativeness, especially when R&D intensity is backed by highly qualified academics on the board.

Model (4*) in model 4* I show the effects of the combination of innovation and accounting certified financial experts on financial health. I include in my model accounting data with innovation and accounting certified financial experts and exclude elite network social capital-Oxbridge. I observe that accounting certified financial experts

has a negative association with financial health (β = -0.027, p = 0.583). However, when I include innovativeness in the model I record a positive association between innovativeness and financial health (β = 0.126, p = 0.083). This results imply that R&D initiatives that combine the knowledge and expertise of accounting certified financial experts can result in a better financial performance. This result implies that accounting certified financial experts should be included in the committee that manages R&D projects in the firm. Their expertise and advice can help reduce operational cost and maximize economic benefits for the firm. Further, I notice a significant positive association between market value and financial health (β = 1.471, p = 0.000), efficiency and financial health (β = 0.949, p = 0.003), a positive association between ROA and financial health (β = 0.0583, p = 0.023), and a significant positive association between current ratio and financial health (β = 0.171, p = 0.048). My results in model 4* show that highly liquid and efficient firms have good financial health and a lower probability of bankruptcy. Further, my findings extend the accounting literature by showing that including accounting certified financial experts in R&D projects can enhance financial health and lower the probability of bankruptcy risk. From the results of my model 4, I refuse to reject hypothesis five, which states that the impact of TMT education level on corporate risk is negative when R&D intensity increases.

Model (5*) In model 5* I include in my model accounting data, accounting certified financial experts and elite network social capital-Oxbridge but exclude innovativeness. My results show a negative association between elite network social capital-Oxbridge and financial health (β = -0.122, p = 0.283) and a negative association between accounting certified financial experts and financial health (β = -0.047, p = 0.583). This implies that, all things been equal, higher education and certified financial accounting skills can enhance financial performance when they support innovativeness in the firm. My results imply that R&D intensity that is supported by the TMT can offer significant positive

results for a firm's financial performance in the long term. Further, my results show that overall there is a negative association between leverage and financial performance. However, in this study I notice that the effects of leverage on financial performance were negative but not significant. Further, my results show an inconsistent association between executive compensation and financial health. Similar to the results above (1*-4*), I notice a significant positive association between market value and financial health ($\beta = 1.468$, $p = 0.000$), efficiency and financial health ($\beta = 0.961$, $p = 0.002$), a positive association between ROA and financial health ($\beta = 0.0586$, $p = 0.020$), and a significant positive association between current ratio and financial health ($\beta = 0.171$, $p = 0.048$). Consistent with models 1*-4*, my results in model 5* show that highly liquid and efficient firms have good financial health and a lower probability of bankruptcy, therefore I refuse to reject hypothesis one. Further, my finding extends the accounting literature by demonstrating the combination of managerial attributes, such as elite network social capital-Oxbridge, and accounting certified financial experts with accounting-based data in a model to predict bankruptcy risk.

Models 1-5 in Table 4.6 show my results for random effects. I perform random effects for comparative purposes to ascertain whether my results from fixed effects show any significant differences from the random effects. In both cases (fixed effect robust and random effect robust), my results were not significantly different. Both results show a significant positive association between firm value and financial health for models 1- 5 and models 1*-5*. Further, there is a significant positive association between liquidity and financial health in both cases. These results imply that highly liquid firms are less likely to go bankrupt. My results on the relationship between executive compensation and bankruptcy risk were mixed and inconclusive. Following My results from the Haussmann test, I focus on the results from the fixed effects. Results can be found on table 4.7 below

Table 4. 7 Regression results –Effects of accounting based model combined with managerial attributes data on financial health

Table 4.7 Regression results	Random effects Regression Analysis (Robust)					Fixed effects Regression Analysis (Robust)				
	(1)	(2)	(3)	(4)	(5)	(1)*	(2)*	(3)*	(4)*	(5)*
Variable	Random effect (Robust)	Random effect (Robust)	Random effect (Robust)	Random effect (Robust)	Random effect (Robust)	Fixed effect (Robust)	Fixed effect (Robust)	Fixed effect (Robust)	Fixed effect (Robust)	Fixed effect (Robust)
R&D intensity	-	0.647***	-0.061	-0.058	-0.062	-	-0.013	0.130*	0.126*	-
	-	(0.208)	(0.0607)	(0.0601)	(0.061)	-	(0.0742)	(0.0635)	(0.0708)	-
Elite network social capital-Oxbridge	1.069***	-	-	-	-	1.023***	-	-	-	-0.122
	(0.434)					(0.436)				(0.0930)
Accounting Finance Experts	-	-	-	0.038	0.0410	-	-	-	-0.027	-0.047
	-	-	-	(0.1001)	(0.1014)	-	-	-	(0.094)	(0.034)
Academic Education	-	-	0.004	-	-	-	-	-	-	-
	-	-	(0.101)	-	-	-	-	-	-	-
Tobin's Q	1.524***	1.485***	1.599***	1.499***	1.484***	1.467***	1.472***	1.548***	1.471***	1.468***
	(0.479)	(0.475)	(0.186)	(0.150)	(0.154)	-0.138	(0.155)	(0.196)	(0.155)	(0.1582)
Debt to Equity ratio	-	-	-0.0014	-0.0001	-0.00012	-0.00005***	-0.00079	-0.0001	-0.00001	-0.00007
	-	-	(0.00009)	(0.0008)	(0.00007)	(0.00003)	(0.00065)	(0.00007)	(0.00006)	(0.00006)
Current ratio	3.448	3.486***	0.220***	0.222**	0.222***	0.174**	0.171**	0.169**	0.171**	0.171***
	(0.459)	-	(0.108)	(0.108)	(0.108)	(0.0782)	(0.077)	(0.077)	(0.078)	(0.078)
Efficiency ratio	1.689	1.901***	0.740***	0.755***	0.758***	1.006***	0.957***	0.937***	0.949***	0.961***
	(0.479)	(0.442)	(0.169)	(0.161)	(0.165)	(0.176)	(0.174)	(0.199)	(0.175)	(0.181)
Log Executive Compensation	0.284	0.410	-0.048	-0.039	-0.042	0.009	-0.032	-0.039	-0.032	-0.0413
	(0.328)	(0.353)	(0.658)	(0.059)	(0.0558)	(0.0502)	(0.0695)	(0.0719)	(0.0696)	(0.0611)
ROA	0.096	0.049	0.062***	0.061***	0.0609***	0.0587***	0.0583***	0.0601***	0.0583***	0.0586***
	(0.121)	(0.106)	(0.008)	(0.0074)	(0.0074)	(0.0066)	(0.0074)	(0.008)	(0.0074)	(0.0075)
Constant	-10.367***	-12.819***	0.708	-	-	-0.2086	0.593	0.606	0.638	0.625
	(5.158)	(5.496)	(0.956)	0.669	0.680	-0.675	(0.996)	(1.013)	(1.004)	(1.225)
Observations	1375.000	1493.000	1221.000	1316.000	1304.000	1375.000	1375.000	1221.000	1316.000	1304.000
R-squared	0.624	0.622	0.525	0.534	0.533	0.624	0.537	0.529	0.537	0.537
Number of id2	238	231.000	205.000	217.000	214.000	238	231	205.000	217.000	214.000
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-
Adjusted R-squared	0.747	0.753	0.446	0.451	0.438	0.747	0.428	0.422	0.427	0.413

Notes. The figures in the brackets are the p-values. Model (1) combines Elite network social capital-Oxbridge network with accounting data but excludes innovation and education Model (2) We combine accounting data with innovation but exclude network and education. Model (3) We combine education innovation and accounting data but excludes Elite network social capital-Oxbridge network. Model (4) We combine accounting data with innovation and professional education but exclude Elite network social capital-Oxbridge network. Model 5 We combined accounting data with innovation, Elite network social capital-Oxbridge network and professional education but exclude academic education. Models 1 - 5 Fixed effects Regression Analysis (Robust); Models 1*-5* Fixed effects Regression Analysis (Robust).

The pooled OLS regression results for models 1-5 in Table 4.7 show that there is a significant positive association between innovativeness and financial health ($\beta = 0.0185$, $p = 0.012$; $\beta = 0.0175$, $p = 0.018$; $\beta = 0.188$, $p = 0.010$; $\beta = 0.0.186$, $p = 0.012$). Further, current ratio, efficiency ratio and ROA all show a positive association with financial health. These results imply that efficient firms with strong liquidity positions are less likely to suffer bankruptcy. Further, pooled OLS regression results in model 1 show a significant positive association between elite network social capital-Oxbridge and corporate financial health ($\beta = 1.042$, $p = 0.052$). This result implies that firms that have more elite network social capital-Oxbridge on their boards are less likely to suffer bankruptcy. My result is consistent with previous studies that posit that elite TMTs are usually perceived by lenders and investors to be more competent and trustworthy in comparison to non-elite CEOs (D'Aveni 1990). I am unable to reject hypothesis two as a result of my observations from models 1-5.

4.14.1 Controlling for endogeneity and the multicollinearity problem – robustness

As part of robustness checks, I performed lagged fixed effects of my models in order to solve possible endogeneity and multicollinearity problems associated with using firm level data this study (Rodgers 2013). In the fixed effects model, the model parameters are non-randomly generated (thus the regression model allows for a fixed grouped mean). In a panel data fixed effects models assist in controlling for unobserved firm heterogeneity problems. Further, the lagged effect enables the minimization of causality problems associated with our control variables. The results of my lagged fixed effect regression are shown in Table 4.7. Further, I assess the variance inflation factor (VIF) for each of my models to identify the extent to which the square of the standard errors in each model has been inflated upwards due a possible correlation between the explanatory variables. I did not record any problem of multicollinearity in my models because all the VIFs in each model were lower than the 4.0 threshold. My control variables in each model include firm

size, firm age, industry identification and firm identification. As part of my robustness check, I control for all of the above in each model. Further, it is important to highlight that all my regression analyses were adjusted by robust standard errors to correct the heteroscedasticity that might affect my results. This approach to checking robustness is consistent with previous corporate governance studies (for example, Bhagat et al., 2008; Greene, 2012)

4.14.2 Lagged fixed effects robust

My lagged fixed effects results show that there is a significant positive association between firm value and financial health in models 1 -5 ($\beta = 1.116$, $p = 0.000$; $\beta = 1.067$, $p = 0.000$; $\beta = 1.206$, $p = 0.000$; $\beta = 1.067$, $p = 0.000$; $\beta = 1.074$, $p = 0.000$). These results confirm hypothesis 1, which states that there is a positive association between firm value and the financial health of firms. Further, I notice a significant positive association between current ratio, efficiency ratio, ROA and financial health in all my five lagged fixed effect models. Also, I notice a positive association between elite network social capital-Oxbridge and financial health in model 1 ($\beta = 0.265$, $p = 0.102$). However, I notice from my lagged results that, on its own (without any interactive terms), there was insignificant negative association between innovativeness and corporate financial health. This result implies that innovation has insignificant negative effects on financial health in the short term, but in the longer term innovation can have a positive effect on financial health and firm value. Further, my results in both model 3 and model 4 show that there is a positive association between accounting certified financial experts and financial health ($\beta = 0.068$, $p = 0.210$; $\beta = 0.066$, $p = 0.218$), respectively. With regard to executive compensation, my lagged fixed effect results show a significant negative association between executive compensation and financial health in all my five models ($\beta = -0.315$, $p = 0.049$; $\beta = -0.207$, $p = 0.051$; $\beta = -0.263$, $p = 0.053$; $\beta = -0.0209$, $p = 0.051$; $\beta = -0.0209$, $p = 0.051$), respectively. Table 4.8 below show the lagged effect of my regression

Table 4. 8 lagged effects of combing accounting data with managerial attributes data on corporate financial health

Table 4.8 lagged effect	Fixed Pooled OLS Regression Analysis (Robust)					Fixed effect lagged Regression Analysis (Robust)				
	(1)	(2)	(3)	(4)	(5)	(1)*	(2)*	(3)*	(4)*	(5)*
Variable	Pooled OLS (Robust	Pooled OLS (Robust)	Pooled OLS (Robust)	Pooled OLS (Robust)	Pooled OLS (Robust)	Fixed effect Lagged (Robust)	Fixed effect Lagged (Robust)	Fixed effect Lagged (Robust)	Fixed effect Lagged (Robust)	Fixed effect Lagged (Robust)
R&D intensity	-	0.0185***	0.0176***	0.0188***	0.0186***	-	-0.0046	-0.006	-0.004	-
	-	(0.0054)	(0.058)	(0.053)	(0.052)	-	(0.0052)	(0.057)	(0.0049)	-
ENSC-Oxbridge	1.042**	-	-	-	0.098	0.265*	-	-	-	0.101
	(0.464)	-	-	-	(0.139)	(0.252)	-	-	-	(0.143)
Accounting Finance Experts	-	-	-	0.066	0.068	-	-	-	0.068	0.066
	-	-	-	(0.0530)	(0.1395)	-	-	-	(0.1027)	0.103
Academic Education	-	-	-0.084	-	-	-	-	-0.141	-	-
	-	-	(0.103)	-	-	-	-	(0.115)	-	-
Tobin's Q	1.619***	1.491***	1.590***	1.492***	1.495***	1.116***	1.067***	1.206***	1.067***	1.074***
	(0.497)	(0.159)	(0.201)	(0.158)	(0.159)	(0.173)	(0.230)	(0.276)	(0.230)	(0.231)
Debt to Equity ratio	-	-0.069**	-0.054**	-0.0012**	-0.0012**	-	-0.0064	-0.0084	-0.006	-0.006
	-	(0.000)	(0.000)	(0.000)	(0.000)	-	(0.000)	(0.000)	(0.000)	(0.000)
Current ratio	3.798***	0.218***	0.218***	0.218***	0.219***	0.920***	0.309***	0.315***	0.311***	0.311
	(0.721)	(0.104)	(0.105)	(0.104)	(0.106)	(0.0399)	(0.106)	(0.105)	(0.106)	(0.106)
Efficiency ratio	1.844***	0.752***	0.729***	0.759***	0.749***	0.437***	0.471***	0.437***	0.476***	0.471***
	(0.134)	(0.164)	(0.178)	(0.164)	(0.164)	(0.272)	(0.192)	(0.196)	(0.187)	(0.192)
Log Executive Compensation	0.178	-0.131	-0.164**	-0.134*	-0.132*	-0.315	-0.207**	-0.263**	-0.209**	-0.209**
	(0.824)	(0.0841)	(0.092)	(0.0842)	(0.0841)	(0.306)	(0.112)	(0.115)	(0.113)	(0.113)
ROA	0.0597***	0.0623***	0.0633***	0.0626***	0.0627***	0.0639***	0.0455***	0.402***	0.0458***	0.0458***
	(0.0058)	(0.0072)	(0.0079)	(0.0071)	(0.0072)	(0.0266)	(0.163)	(0.0179)	(0.0161)	(0.0161)
Constant	-9.719	1.919**	2.225**	1.858**	1.847	4.552***	4.124***	4.922***	4.049***	4.069
	(1.539)	(1.106)	(1.150)	(1.106)	(1.105)	(1.441)	(1.630)	(1.718)	(1.652)	(1.659)
Observations	1618.000	1299.000	1202.000	1299.000	1291.000	1556.000	1249.000	1158.000	1249.000	1241.000
R-squared	0.717	0.532	0.551	0.545	0.543	0.623	0.528	0.550	0.528	0.525
Number of id2	237	219.000	207.000	219.000	218.000	236	218.000	206.000	217.000	217.000
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-
Adjusted R-squared	0.633	0.455	0.449	0.456	0.454	0.531	0.402	0.412	0.402	0.401

Notes. The figures in the brackets are the p-values. Model (1) combines Elite network social capital-Oxbridge network with accounting data but excludes innovation and education Model (2) We combine accounting data with innovation but exclude network and education. **Model (3)** We combine education innovation and accounting data but excludes Elite network social capital-Oxbridge network. **Model (4)** We combine accounting data with innovation and professional education but exclude Elite network social capital-Oxbridge network. **Model 5** We combined accounting data with innovation, Elite network social capital-Oxbridge network and professional education but exclude academic education. Models 1*-5* shows the lagged OLS results for Models 1-5. Note: Following (…) we control for endogeneity by lagging the fixed effect.

The pooled OLS regression results in models 1-5 in Table 4.8 show that there is a significant positive association between innovativeness and financial health ($\beta = 0.0185$, $p = 0.012$; $\beta = 0.0175$, $p = 0.018$; $\beta = 0.188$, $p = 0.010$; $\beta = 0.0.186$, $p = 0.012$). Further, current ratio, efficiency ratio and ROA all show a positive association with financial health. These results imply that efficient firms with strong liquidity positions are less likely to suffer bankruptcy. Further, pooled OLS regression results in model 1 show a significant positive association between elite network social capital-Oxbridge and corporate financial health ($\beta = 1.042$, $p = 0.052$). This result implies that firms that have more elite network social capital-Oxbridge on their boards are less likely to suffer bankruptcy. My result is consistent with previous studies that posit that elite TMTs are usually perceived by lenders and investors to be more competent and trustworthy in comparison to non-elite CEOs (D'Aveni 1990). I am unable to reject hypothesis three as a result of my findings from table 4.8, models 1-5.

4.14.3 Robustness-Controlling for endogeneity and the multicollinearity problem

As part of my robustness checks, I notice the possibility of the endogeneity problem in my accounting data such as current ratio and cash ratio, ROA and executive compensation. The results of my lagged fixed effect regression are shown in Table 4.8 In addition, I compute the variance inflation factor (VIF) for each of my models to identify the extent to which the square of the standard errors in each model has been inflated upwards due a possible correlation between the explanatory variables. I did not record any problem of multicollinearity in my models because all the VIFs in each model were lower than the 4.0 threshold. My control variables in each model include firm size, firm age, industry identification and firm identification. As part of my robustness check, I control for all of the above in each model. Further, it is important to highlight that all my regression analyses were adjusted by robust standard errors to correct any heteroscedasticity that might affect my results. This approach for checking robustness is

consistent with previous corporate governance studies (for example, Bhagat et al., 2008; Greene, 2012)

4.14.4 Lagged fixed effects of accounting and managerial attributes data on financial health

My lagged fixed effects results show that there is a significant positive association between firm value and financial health in model 1 -5 ($\beta = 1.116$, $p = 0.000$; $\beta = 1.067$, $p = 0.000$; $\beta = 1.206$, $p = 0.000$; $\beta = 1.067$, $p = 0.000$; $\beta = 1.074$, $p = 0.000$). These results confirm hypothesis 1, which states that there is a positive association between firm value and the financial health of firms. Further, I notice a significant positive association between current ratio, efficiency ratio, ROA and financial health in all of my five lagged fixed effect models. Also, I notice a positive association between elite network social capital-Oxbridge and financial health in model 1 ($\beta = 0.265$, $p = 0.102$). However, I notice from my lagged results that, on its own (without any interactive terms), there was insignificant negative association between innovativeness and corporate financial health. This result implies that innovation has insignificant negative effects on financial health in a short term, but in the longer term innovation can have a positive effect on financial health and firm value. Further, my results in both model 3 and model 4 show that there is a positive association between accounting certified financial experts and financial health ($\beta = 0.068$, $p = 0.210$; $\beta = 0.066$, $p = 0.218$), respectively. With regard to executive compensation, my lagged fixed effect results show a significant negative association between executive compensation and financial health in all my five models ($\beta = -0.315$, $p = 0.049$; $\beta = -0.207$, $p = 0.051$; $\beta = -0.263$, $p = 0.053$; $\beta = -0.0209$, $p = 0.051$; $\beta = -0.0209$, $p = 0.051$), respectively.

4.14.5 Interactions of accounting data and managerial attributes data

Following Rodger (2013), I improve the robustness of my models by combining the interactive terms of managerial attributes variables with the accounting-based bankruptcy

prediction models to measure bankruptcy risk. First, this strategy is consistent with previous studies that show that bankruptcy risk prediction combining traditional accounting-based data with corporate governance data can provide a significant signal for bankruptcy risk prediction (Fich & Slezak, 2008). Second, I decompose managerial level data into academic education, firm-specific experience, elite global education, elite network social capital-Oxbridge and accounting certified financial experts. An obvious gap in the existing literature is that most of the bankruptcy predicting models tend to rely on accounting data or market data with little or no emphasis on managerial level data (Fich & Slezak, 2008). However, to fully understand value creation, sustainable growth and bankruptcy risk, I need to incorporate the unique managerial cognitive attributes such as education, experience and elite social capital into the bankruptcy predicting models. As far as I am aware, no other study has included variables such as elite network social capital-Oxbridge, elite global social capital, accounting certified finance experts, academic education of TMTs and TMTs' industry-specific experience all in one model to measure bankruptcy risk. I contribute to the extant accounting literature by including combinations of managerial attributes into the accounting-based bankruptcy model to measure the probability of a firm's facing bankruptcy risk. Table 4.9 and 4.10 shows my random effect robust and fixed effects robust results for combining managerial level data with accounting data to predict the corporate bankruptcy risk.

Table 4. 9 Bankruptcy prediction based on combinations of accounting data, managerial attributes data and market data-Random effects

Table 4.6.0 VARIABLES	(6) Random effect Robust	(7) Random effect Robust	(8) Random effect Robust	(9) Random effect Robust	(10) Random effect Robust	(11) Random effect Robust
Tobin's Q	1.425***	1.470***	1.423***	1.433***	0.1476***	1.424***
	(0.157)	(0.175)	(0.157)	(0.157)	(1.769)	(0.1562)
Firm Size (Ln)	0.0100	-0.0039	0.156	0.0135	0.0099	-0.0207
	(0.094)	(0.093)	(0.0944)	(0.0961)	(0.097)	(0.094)
Firm Age (Ln)	-0.777	-0.0684	-0.094	-0.0705	-0.0880	-0.0423
	(0.142)	(0.158)	(0.1388)	(0.146)	(0.160)	(0.1532)
Debt to Equity ratio	-0.002***	-0.0025***	-0.0023***	-0.0023***	-0.00255***	-0.00232***
	(0.0004)	(0.0005)	(0.00043)	(0.00043)	(0.0005)	(0.00042)
ROA	0.067***	0.066***	0.0667***	0.0661***	0.0670***	0.0676***
	(0.0080)	(0.008)	(0.0079)	(0.0078)	(0.0084)	(0.0080)
Exec Compensation	-0.0403	-0.0504	-0.0503	-0.0338	-0.0484	-0.0110
	(0.0852)	(0.0874)	(0.0879)	(0.0866)	(0.0884)	(0.086)
Efficiency	0.779***	0.826***	0.801***	0.720***	0.767***	0.7835***
	(0.207)	(0.212)	(0.2026)	(0.216)	(0.2120)	(0.206)
Cash ratio	0.143***	0.160***	0.141***	0.159***	0.153***	0.157***
	(0.0550)	(0.0572)	(0.0538)	(0.0540)	(0.0542)	(0.0553)
R&D intensity	0.0646*					
	(0.0602)					
R&D x Education		0.0583**				
		(0.0326)				
R&D x Experience			0.0470***			
			(0.0216)			
R&D x Elite network ENSC-Oxbridge				0.0006		
				(0.0204))		
R&D x Elite (Global)					0.0235*	
					(0.0274)	
R&D x P. Education						0.0861***
						(0.0373)
Constant	1.274***	1.364***	1.333***	1.298	1.452***	1.058***
	(1.230)	(1.212)	(1.249)	(1.252)	(1.275)	(1.222)
Observations	1,230	1,143	1,221	1,222	1,150	1,230
R-squared	0.499	0.497	0.502	0.497	0.487	0.503
Number of id2	208	196	208	207	202	208
Year	Yes	Yes	Yes	Yes	Yes	Yes
Sector	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.404	0.384	0.402	0.410	0.405	0.406

Note: Robust standard errors in parentheses (*** p<0.01, ** p<0.05, *p<0.1).
Model 1-6 report the results of our regression analysis (fixed effects) with our dependent variable equals Volatility of firm returns. Model 1 we combined Altman's Z-score accounting based bankruptcy model with R&D intensity; Model 2 we combined Altman's Z-score accounting based bankruptcy model with R&D intensity x education; Model 3 we combined Altman's Z-score accounting based bankruptcy model with R&D intensity x industry specific experience; Model 4 we combined Altman's Z-score accounting based bankruptcy model with R&D intensity x Elite network social capital-Oxbridge; Model 5 we combined Altman's Z-score accounting based bankruptcy model with R&D

Table 4. 10 Bankruptcy prediction based on combinations of accounting, managerial attributes data and market data-Fixed effects

Table 4.6.1 VARIABLES	(6)* Fixed effect Robust	(7)* Fixed effect Robust	(8)* Fixed effect Robust	(9)* Fixed effect Robust	(10)* Fixed effect Robust	(11)* Fixed effect Robust
Tobin's Q	1.339***	1.409***	1.344***	1.341***	1.413***	1.332***
	(0.210)	(0.226)	(0.211)	(0.212)	(0.225)	(0.210)
Firm Size (Ln)	0.330	0.389*	0.358*	0.322	0.439**	0.242
	(0.208)	(0.206)	(0.211)	(0.215)	(0.217)	(0.209)
Firm Age (Ln)	-0.118	-0.0619	-0.128	-0.128	-0.108	-0.0740
	(0.159)	(0.190)	(0.160)	(0.159)	(0.188)	(0.172)
Debt to Equity ratio	-0.00181***	-0.00195***	-0.00183***	-0.00185***	-0.00193***	-0.00186***
	(0.000407)	(0.000460)	(0.000420)	(0.000414)	(0.000471)	(0.000417)
ROA	0.0661***	0.0657***	0.0659***	0.0657***	0.0673***	0.0677***
	(0.0109)	(0.0110)	(0.0108)	(0.0109)	(0.0114)	(0.0110)
Exec Compensation	-0.154	-0.164	-0.165	-0.151	-0.153	-0.125
	(0.105)	(0.108)	(0.108)	(0.107)	(0.109)	(0.108)
Efficiency	1.136***	1.278***	1.154***	1.078***	1.192***	1.105***
	(0.185)	(0.184)	(0.179)	(0.199)	(0.194)	(0.186)
Cash ratio	0.151***	0.150***	0.151***	0.151***	0.149***	0.150***
	(0.0570)	(0.0562)	(0.0568)	(0.0570)	(0.0562)	(0.0573)
R&D intensity	0.0174					
	(0.0696)					
R&D x Education		0.0666**				
		(0.0103)				
R&D x Experience			0.0487***			
			(0.0170)			
R&D x Elite network ENSC-Oxbridge				0.0370*		
				(0.0322)		
R&D x Elite (Global)					0.0391*	
					(0.0314)	
R&D x P. Education						0.0905**
						(0.0093)
Constant	-0.504	-1.209	-0.549	-0.294	-1.488	-0.207
	(1.724)	(1.490)	(1.689)	(1.832)	(1.712)	(1.696)
Observations	1,228	1,141	1,219	1,220	1,148	1,228
R-squared	0.403	0.421	0.405	0.400	0.413	0.406
Number of id2	208	196	208	207	202	208
Year	Yes	Yes	Yes	Yes	Yes	Yes
Sector	-	-	-	-	-	-
Adjusted R-squared	0.310	0.277	0.306	0.320	0.285	0.333

Note: Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).
Model 1-6 report the results of our regression analysis (fixed effects) with our dependent variable equals Volatility of firm returns. Model 1 we combined Altman's Z-score accounting based bankruptcy model with R&D intensity; Model 2 we combined Altman's Z-score accounting based bankruptcy model with R&D intensity x education; Model 3 we combined Altman's Z-score accounting based bankruptcy model with R&D intensity x industry specific experience; Model 4 we combined Altman's Z-score accounting based bankruptcy model with R&D intensity x Elite network social capital-Oxbridge; Model 5 we combined Altman's Z-score accounting based bankruptcy model with R&D

Model (6) in model 6, I show the effects of the combinations of accounting-based and market-based variables with R&D expenditure on financial health. My results indicate that there is a significant positive association between firm value and financial health (β = 1.339, p = 0.000). This result implies that investors place a higher value on firms that have good financial health and a lower value on those with poor financial health. Further, I notice a significant positive association between operational efficiency and financial health (β = 1.136, p = 0.004) and a positive association between ROA and financial health (β = 0.0661, p = 0.008). These results confirm first hypothesis, which posits that more efficient firms that generate a higher profit have a lower probability of bankruptcy. In contrast, I notice a significant negative association between a high debt to equity ratio and financial health (β = -0.00181, p = 0.010). This result implies that highly geared firms have a higher probability of bankruptcy. This result is consistent with previous studies that posit that highly leveraged firms have a higher probability of bankruptcy (Verwijmeren, 2010). Further, my results show a positive association between cash ratio and financial health. (β = 0.151, p = 0.011). This implies that firms with high cash ratios have a lower probability of bankruptcy because they are able to meet both their short-term and long-term debt and interest rate obligations. I notice an insignificant positive association between R&D expenditure and financial health (β = 0.087, p = 0.160).

Model (7) in model 7, I replace R&D expenditure in model 6 with the interactive term of R&D expenditure and education to identify any possible changes to model 6. My results were very similar to those in model 6, thus indicating a significant positive association between firm value and financial health (β = 1.409, p = 0.000), a significant positive association between operational efficiency and financial health (β = 1.278, p = 0.001), a positive association between ROA and financial health (β = 0.0657, p = 0.009), and a significant negative association between a high debt to equity ratio and financial health (β = -0.00195, p = 0.010). My result from model 6-11 shows that efficient firms are more

profitable, hence have less bankruptcy probability. As a result I am unable to reject My hypothesis (H1) Further, I notice that R&D expenditure combined with education has a significant positive associated with financial health (β = 0.0666, p = 0.031). My result from model 7 is consistent with my hypothesis therefore I am unable to reject it. My results implies that firm that have high probability of bankruptcy have to employ highly qualified CEOs who have good track records of promoting R&D.

Model (8) in model 8, I replace the interactions of R&D expenditure and education in model 7 with the interaction of R&D expenditure and industry-specific experience. My results are consistent with those in model 7, thus indicating a significant positive association between firm value and financial health (β = 1.344, p = 0.000), a significant positive association between operational efficiency and financial health (β = 1.154, p = 0.001), a positive association between ROA and financial health (β = 0.0659, p = 0.009), and a significant negative association between a high debt to equity ratio and financial health (β = -0.00183, p = 0.010). Further, I notice that R&D expenditure combined with industry-specific experience has a significant positive associated with financial health (β = 0.0487, p = 0.051). This result implies that TMTs with a high level of industry-specific experience that support innovation are valuable for financial health. My results show that firms that have a high probability of bankruptcy have to employ CEOs with industry-specific experience who are keen on promoting innovation through research and development. My results from model 8 are consistent with H3a therefore I am unable to reject it.

Model (9) in model 9, I show the effect of replacing R&D expenditure and industry-specific experience with R&D expenditure and elite network social capital-Oxbridge. I notice a significant positive association between firm value and financial health (β = 1.341, p = 0.000), a significant positive association between operational efficiency and financial health (β = 1.078, p = 0.004), a positive association between ROA and financial

health ($\beta = 0.0657$, $p = 0.008$) and a significant negative association between a high debt to equity ratio and financial health ($\beta = -0.00185$, $p = 0.011$). Further, I notice that R&D expenditure combined with elite network social capital-Oxbridge has a positive association with financial health ($\beta = 0.0370$, $p = 0.101$) therefore, I am unable to reject my hypothesis four. However, I notice that in comparison to models 8 and 7, industry-specific experience and higher education combined with R&D expenditure provide a better corporate financial performance and a relatively better coefficient of determination ($R^2 = 0.421$ and $R^2 = 0.405$), respectively. This result implies that distressed firms should prioritise recruiting CEOs with more industry-specific experience with a strong interest in promoting R&D over CEOs with an elite network social capital.

Model (10) in model 10, I replace R&D and elite network social capital-Oxbridge with the interactive terms of R&D and elite global network. Again, I notice a significant positive association between firm value and financial health ($\beta = 1.413$, $p = 0.000$), a significant positive association between operational efficiency and financial health ($\beta = 1.192$, $p = 0.000$), a positive association between ROA and financial health ($\beta = 0.0673$, $p = 0.008$) and a significant negative association between a high debt to equity ratio and financial health ($\beta = -0.00193$, $p = 0.010$). Further, I notice that R&D expenditure combined with elite global social capital has a positive association with financial health ($\beta = 0.0391$, $p = 0.010$). This result is consistent with my hypothesis four. However, I observed that, even though elite social capital offers a positive value to corporate financial health, CEOs with high academic qualifications and industry-specific experience should be prioritised over elitism during the recruitment process.

In model (11) I consider the effect of the interactive terms of accounting finance experts and R&D expenditure on corporate financial health. My results show a significant positive association between accounting finance experts and firm value ($\beta = 0.0905$, $p = 0.044$). It should be noted that these effects are stronger when compared to the results in

models (9) and (10). Further, I observe a higher coefficient of determination of ($R^2=$ 0.438) in comparison to model 9 ($R^2=$ 0.400) and model 10 ($R^2=$ 0.413). These stronger effects could be attributed to the fact that successful R&D projects require significant individuals with a higher level of knowledge on investment and risk appraisal. Further, previous studies have shown that accounting financial experts have a significant negative association with earnings management. From my previous discussions in chapter 2, I notice that earnings management and other acts of financial malfeasance among TMTs constitute one of the key reasons for corporate bankruptcy. Therefore, this result implies that having more accounting certified finance experts on the board may reduce the bankruptcy probability. My results from models 6 to 11 are consistent with my hypotheses two, three, four and five. Therefore I refuse to reject these.

4.6.8 Robustness to standard deviation of market returns volatility

I follow Hillegeist et al. (2004), who argue that the stock market offers a better and superior source of information regarding bankruptcy predictions in comparison to the accounting-based model (because the stock market incorporates firm level data with market level data in predicting bankruptcy probability). I increase the robustness of my model by substituting my dependent variable (the Altman Z-score) with the standard deviation of the volatility of market returns. My results show a significant improvement in the bankruptcy predictions in comparison to the accounting-based model.

Model (1) in model 1 in Table 4.9 and 4.10, I combined managerial attributes, accounting based information and R&D information to predict corporate bankruptcy risk. Following previous studies, I measure corporate bankruptcy risk by using the standard deviation of stock market returns volatility.(Hillegeist, 2004; Tinoco, 2013) My results show a significant positive association between firm value and market returns volatility ($\beta = 0.0140$, $p = 0.011$). This results is consistent with previous studies that show that uncertainties about a firm's market returns can increase firm value because in real options

models, volatile future rewards increase firm value (Chi & Su, 2017). Further, I notice a significant negative association between firm size and market return volatility (β = -0.0015, p = 0.014) and a significant negative association between ROA and market returns volatility (β = -0.0092, p = 0.009). These results are consistent with the information asymmetry theory, which posits that the availability of market information will cause investors to move away from highly risky firms. Larger firms mostly operate in an efficient market. Further, investors in larger firms are very sensitive to market returns volatility (Perez-Quiros & Timmermann, 2000). I notice a significant negative association between executive compensation and market returns volatility (β = -0.0015, p = 0.013). This result implies that a high volatility of market returns can have a negative effect on the total wealth of a firm. Therefore, most firms will prefer to offer their mangers an increase in executive share options and lower compensations and bonuses. Further, I notice a significant negative association between leverage and market return volatility (β = -0.0005, p = 0.014). This result is consistent with previous studies that posit that highly leveraged firms have a higher probability of bankruptcy. I notice an insignificant negative association between R&D expenditure and financial health (β = -0.0006, p = 0.420). In Table 4.11 and 4.12 I increase the robustness of my results by performing Tobit regression on my model in table 4.11 and 4.12. I perform Tobit regression because of the volatility nature of my dependent variable (standard deviation of stock market returns volatility).

Table 4. 11 Tobit regression results-dependent variable standard deviation of the volatility of stock market returns-Random effects

Table 4.508 VARIABLES	(6)* Random effects Robust	(7)* Random effects Robust	(8)* Random effects Robust	(9)* Random effects Robust	(10)* Random effects Robust	(11)* Random effects Robust
Tobin's Q	-0.0125***	-0.0135***	-0.00125***	-0.00139***	-0.0136***	-0.0140***
	(0.0004)	(0.0003)	(0.0004)	(0.0003)	(0.0003)	(0.0003)
Firm Size (Ln)	-0.0031*	0.0033*	0.0032***	0.0015***	0.0030***	0.0014***
	(0.0002)	(0.0002)	(0.0002)	(0.0004)	(0.0002)	(0.0004)
Firm Age (Ln)	-0.0003	-0.0003	0.0003	0.0004	0.0003	0.0005
	(0.0002)	(0.0002)	(0.0002)	(0.0004)	(0.0002)	(0.0004)
Debt to Equity ratio	-0.0002***	-0.0002***	-0.0002***	-0.0002***	-0.0002***	-0.0002***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
ROA	-0.00143***	-0.00145***	-0.00143***	-0.00147***	-0.00142***	-0.00143***
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Exec Compensation	-0.00137***	-0.00121***	-0.00130***	-0.00159***	-0.00130***	-0.00139
	(0.00005)	(0.00005)	(0.0005)	(0.0004)	(0.0005)	(0.0005)
Efficiency	0.0003	-0.0001	-0.0002	-0.0006	0.0002	0.0002
	(0.0001)	(0.0004)	(0.0003)	(0.0009)	(0.0003)	(0.0003)
Cash ratio	-0.0007	-0.0008	-0.0009	-0.0002	-0.0009	-0.0001
	(0.0003)	(0.0003)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
R&D intensity	-0.0004					
	(0.0003)					
R&D x Education		-0.0012**				
		(0.0002)				
R&D x Experience			-0.0002			
			(0.0003)			
R&D x Elite network ENSC-Oxbridge				0.0006*		
				(0.0002)		
R&D x Elite (Global)					-0.0005*	
					(0.00002)	
R&D x P. Education						-0.0016**
						(0.00002)
Constant	0.0265***	0.0249***	0.0257***	0.0401***	0.0259***	0.0268***
	(0.0061)	(0.0063)	(0.0062)	(0.0074)	(0.0063)	(0.0061)
Observations	1,263	1,167	1,253	1,255	1,175	1,263
R-squared	0.1373	0.1301	0.1345	0.1436	0.1311	0.1380
Number of id2	210	198	210	209	204	210
Year	Yes	Yes	Yes	Yes	Yes	Yes
Sector	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.1260	0.1243	0.1255	0.1258	0.1259	0.1259

Note: Robust standard errors in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$). This table provides the parameter estimates from market based bankruptcy prediction model We use Tobit because volatility (standard deviation) limits $+\geq 0$ Dependent variable Volatility of firm returns (standard deviation). Our results from Tobit were very similar to our pooled OLS regression results. Model 1-6 report the results of our regression analysis (fixed effects) with our dependent variable equals Volatility of firm returns. **Model 1** we combined Altman's Z-score accounting based bankruptcy model with R&D intensity; **Model 2** we combined Altman's Z-score accounting based bankruptcy model with R&D intensity x education; **Model 3** we combined Altman's Z-score accounting based bankruptcy model with R&D intensity x industry specific experience; **Model 4** we combined Altman's Z-score accounting based bankruptcy model with R&D intensity x Elite network social capital-Oxbridge; **Model 5** we combined Altman's Z-score accounting based bankruptcy model with R&D intensity x Elite social capital (global); **Model 6** we combined Altman's Z-score accounting based bankruptcy model with R&D intensity with accounting certified experts

Table 4. 12 Tobit regression results -dependent variable-standard deviation of stock market return volatility

Table 8 VARIABLES	(6) Fixed effect Robust	(7) Fixed effect Robust	(8) Fixed effect Robust	(9) Fixed effect Robust	(10) Fixed effect Robust	(11) Fixed effect Robust
Tobin's Q	0.0140***	0.0153***	0.0139***	0.0014***	0.0154***	0.0140***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Firm Size (Ln)	-0.0015***	-0.0015***	-0.0014***	-0.0015***	-0.0015***	-0.0013***
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Firm Age (Ln)	0.0005	0.0002	0.0006	0.0004	-0.0006	-0.0005
	(0.0004)	(0.0005)	(0.0004)	(0.0004)	(0.0005)	(0.0004)
Debt to Equity ratio	-0.0005***	-0.0006***	-0.0005***	-0.0005***	-0.0011***	-0.0014***
	(0.0004)	(0.0003)	(0.0004)	(0.0004)	(0.0002)	(0.0002)
ROA	-0.0092***	-0.0146***	-0.00148***	-0.0147***	-0.0143***	-0.00149***
	(0.0004)	(0.0003)	(0.0003)	(0.0003)	(0.0004)	(0.0003)
Exec Compensation	-0.0015***	-0.0014***	-0.0015***	-0.0015***	-0.0014***	-0.0016***
	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)
Efficiency	-0.0007	-0.0009	-0.0006	-0.0006	-0.0009	-0.0006
	(0.0009)	(0.0008)	(0.0009)	(0.0009)	(0.0008)	(0.0009)
Cash ratio	-0.0002	-0.0002	-0.0002	-0.0002	-0.0001	-0.0002
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
R&D intensity	-0.0006					
	(0.0006)					
R&D x Education		-0.0019**				
		(0.0003)				
R&D x Experience			-0.0022**			
			(0.0002)			
R&D x Elite network ENSC-Oxbridge				-0.0025**		
				(0.0001)		
R&D x Elite (Global)					-0.0022**	
					-0.0006	
R&D x P. Education						-0.0019**
						(0.0068)
Constant	0.0396***	0.0386***	0.0392***	0.04011***	0.392***	0.0397***
	(0.0072)	(0.0076)	(0.0074)	(0.0074)	(0.0076)	(0.0072)
Observations	1,263	1,167	1,253	1,255	1,175	1,263
R-squared	0.144	0.138	0.141	0.143	0.138	0.144
Number of id2	210	198	210	209	204	210
Year	Yes	Yes	Yes	Yes	Yes	Yes
Sector	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.0694	0.0606	0.0660	0.0650	0.0645	0.0730

Note: Robust standard errors in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$). We use Tobit because volatility (standard deviation) limits $+\geq 0$ Dependent variable = Volatility of firm returns (standard deviation). **Model 1-6** report the results of our regression analysis (fixed effects) with our dependent variable equals Volatility of firm returns. **Model 1** we combined Altman's Z-score accounting based bankruptcy model with R&D intensity; **Model 2** we combined Altman's Z-score accounting based bankruptcy model with R&D intensity x education; **Model 3** we combined Altman's Z-score accounting based bankruptcy model with R&D intensity x industry specific experience; **Model 4** we combined Altman's Z-score accounting based bankruptcy model with R&D intensity x Elite network social capital-Oxbridge; **Model 5** we combined Altman's Z-score accounting based bankruptcy model with R&D intensity x Elite social capital (global); **Model 6** we combined Altman's Z-score accounting based bankruptcy model with R&D intensity with accounting certified experts

In **model (7)** in Table 4.12, I replace R&D expenditure in model 6 with the interactive term of R&D expenditure and education to identify any possible changes to model 6. My

results are very similar to those of model 6, thus indicating a significant positive association between firm value and bankruptcy probability ($\beta = 0.0153$, $p = 0.010$), a significant negative association between firm size and bankruptcy probability ($\beta = -0.0015$, $p = 0.013$), a negative association between ROA and probability of bankruptcy ($\beta = -0.0146$, $p = 0.010$), and a significant negative association between leverage and bankruptcy probability ($\beta = -0.0006$, $p = 0.014$). Further, I observe that R&D expenditure combined with education has a significant negative association with bankruptcy probability ($\beta = -0.0019$, $p = 0.051$). This result implies that TMTs with a high level of education that support innovation may have a positive effect in reducing bankruptcy probability. This result is consistent with that of D'Aveni (1990), who posits that education has a significant negative association with bankruptcy probability

In **model (8)** in table 4.12, I exclude the interactions of R&D expenditure and education in but include the interaction of R&D expenditure and industry-specific experience into my model. My results show a significant negative association between firm value and bankruptcy probability ($\beta = -0.0139$, $p = 0.011$) and a significant negative association between firm size and bankruptcy probability ($\beta = -0.0014$, $p = 0.011$). These results are consistent with my hypothesis, which states that bigger firms have less probability of bankruptcy because larger firms usually have access to larger resources and capabilities that can be drawn upon to deal with bankruptcy risks. Further, I notice a significant negative association between ROA and financial health ($\beta = -0.00148$, $p = 0.009$) and a significant negative association between a high debt to equity ratio and bankruptcy probability ($\beta = -0.005$, $p = 0.014$). Also, I notice that R&D expenditure combined with industry-specific experience has a significant negative associated with bankruptcy probability ($\beta = -0.0022$, $p = 0.054$). These results imply that TMTs with a high level of industry-specific experience that support innovation can reduce bankruptcy probability in a firm.

In **model (9)** in table 4.12, I show the effect of replacing R&D expenditure and industry-specific experience with R&D expenditure and elite network social capital-Oxbridge in My model. I notice a similar result to those for models 1, 2 and 3. However, I observe that R&D expenditure combined with elite network social capital-Oxbridge has a significant negative association with bankruptcy probability (β = -0.0025, p = 0.53). This result is different compared to the results in table 4.12, when the interactive term of R&D expenditure and elite network social capital-Oxbridge in the same model had an insignificant positive association with financial health. This results implies that elite network or social capital such us elite network social capital-Oxbridge plays a crucial role in averting bankruptcy risk, especially in the context of the market-based bankruptcy model. This result is consistent with previous studies that argue that failing firms usually have a decline in TMT prestige, therefore employing CEOs from elite university backgrounds can contribute positively to reducing the bankruptcy probability (D'Aveni, 1990).

In **model (10)** in table 4.12, I replace R&D and elite network social capital-Oxbridge with the interactive terms of R&D and elite network social capital. My results shows a significant negative association between R&D with elite global social capital and bankruptcy probability (β = -0.0022, p = 0.54). This result is similar to that in model 4. Further, I notice that executive compensation has a significant negative association with bankruptcy risk in all of my six models (β = -0.0015, p = 0.11; β = -0.0014, p = 0.12; β = -0.0015, p = 0.11; β = -0.0015, p = 0.11; β = -0.0014, p = 0.12; β = -0.0014, p = 0.12), respectively. This result implies that most experienced and well-qualified directors leave failing firms, so the less skilful ones are paid less compensation. Thus, to reduce the probability of bankruptcy, firms have to pay higher compensation to attract more efficient and experienced CEOs.

In **model (11)** in table 40, I consider the interactive terms of accounting finance experts and R&D expenditure on corporate financial health. My results show a significant negative association between R&D intensity with accounting finance experts and bankruptcy probability (β = -0.0019, p = 0.054). Further, I observe a higher coefficient of determination (R^2= 0.144) in comparison to model 5 (R^2= 0.138). This result is consistent with my hypothesis three c (H3c) therefore I am unable to reject it.

In table 41 I show the sign of my hypothesis for my regression results.

Table 4. 13 Hypothesis testing-summary results

Hypothesis	Sign	Results	Decision
H1: There is a positive association between firm efficiency and corporate risk	(+)	(+)	Accept
H2: There is a negative association between elite network social capital (ENSC) and corporate risk.	(-)	(-)	Accept
H3a: The impact of R&D on corporate risk is positive for firms with TMT that has elite educational background.	(+)	(+)	Accept
H3b: The impact of R&D on corporate risk is positive for firms with TMT that has industry specific experience.	(+)	(+)	Accept
H3c: The impact of R&D on corporate risk is positive for firms with TMT that has accounting certified finance expertise.	(+)	(+)	Accept
H4: Firm that employ TMT who belong to the global elite network have lower risk compared to their counterparts.	(-)	(-)	Accept
H5: The impact of TMT education level on corporate risk is negative when TMT innovativeness increases.	(-)	(-)	Accept
H6: The combinations of managerial attributes data with the traditional accounting based model and the stock market return volatility model increase corporate risk predictive significant.	Higher	??	Yes

4.14.6 Matched sample test of ENSC and R&D variables-Robustness

Considering that my data is observed across time (panel data) and across varied industry sectors, I further increase the robustness of my results by comparing my observations on ENSC and TMT innovativeness (R&D intensity) across the different sectors within my dataset in order to test for the consistency of my findings. My findings from the sectorial analysis indicate that R&D is highest in the information and technology sectors but lowest in the energy and utility sectors in comparison to the other sectors. Further, my findings show that the information and technology sectors and the industrial sectors have the most elite network social capital-Oxbridge in comparison to the other sectors. Also, to my surprise, I notice that the information and technology sectors recorded the highest number of accounting certified finance experts in comparison to the other sectors, including the financial sector. Table 42 below show the results. Table 43 show the summary statistics for univariate analysis of R&D intensity.

Table 4. 14 Summary statistics by sector

Industry sector	variable	N	mean	SD	Min	Max
Basic Material	R&D intensity	169	0.614	1.173	0.001	6.580
	ENSC-Oxbridge	207	0.043	0.204	0.000	1.000
	Accounting Finance Expert	207	0.865	0.343	0.000	1.000
Consumers	R&D intensity	870	1.325	4.774	0.001	40.141
	ENSC-Oxbridge	1089	0.168	0.374	0.000	1.000
	Accounting Finance Expert	1098	0.893	0.309	0.000	1.000
Energy and Utility	R&D intensity	120	0.094	0.122	0.001	0.413
	ENSC-Oxbridge	144	0.111	0.315	0.000	1.000
	Accounting Finance Expert	144	0.813	0.392	0.000	1.000
Financials	R&D intensity	138	1.162	4.651	0.001	33.333
	ENSC-Oxbridge	756	0.237	0.425	0.000	1.000
	Accounting Finance Expert	756	0.892	0.311	0.000	1.000
Industrial	R&D intensity	276	1.894	2.766	0.001	13.799
	ENSC-Oxbridge	333	0.255	0.437	0.000	1.000
	Accounting Finance Expert	333	0.889	0.315	0.000	1.000
Inform & Tech	R&D intensity	187	4.752	7.927	0.001	36.789
	ENSC-Oxbridge	261	0.266	0.419	0.000	1.000
	Accounting Finance Expert	261	0.897	0.305	0.000	1.000
Total	R&D intensity	1760	1.613	4.721	0.001	40.141
	ENSC-Oxbridge	2790	0.190	0.393	0.000	1.000
	Accounting Finance Expert	2799	0.886	0.317	0.000	1.000

Our findings from the sectorial analysis indicates that R&D is highest in the information and technology sectors but lowest in energy and utility sector comparison to the other sectors. Further, our findings show that information and technology sector and the industrial sectors have most Elite network social capital-Oxbridge in comparison to the other sectors. Also to our surprise, we notice that, the information and technology sectors record the highest number of accounting certified finance experts in comparison to the other sectors including the financial sector

Table 4. 15 R&D effects sector analysis (summary statistics)

Descriptive Statistics				Industry Sector Analysis			
Year	Mean	Standard Deviation	Frequency	Industry Sector	Mean	Standard Deviation.	Frequency
2008	2.785	5.822	103	Basic Material	0.614	1.173	169
2009	1.653	5.204	204	Consumers	1.325	4.774	870
2010	1.525	4.664	207	Energy and Utilities	0.094	0.122	120
2011	1.426	4.413	214	Financials	1.162	4.651	138
2012	1.395	4.079	223	Industrial	1.894	2.766	276
2013	1.536	4.241	226	Information and Technology	4.752	7.927	187
2014	1.496	4.226	230				
2015	1.675	5.030	235				
2016	1.682	5.625	118				
Total	1.613	4.721	1,760	Total	1.613	4.721	1,760

4.14.7 Univariate analysis

Following Mehran et al. (2011), I use pair comparisons and aggregate quality to further investigate the heterogeneities of elite network social capital-Oxbridge variable in my bankruptcy model. Thus, I divide my dataset into non-elite network social capital-Oxbridge and elite network social capital-Oxbridge. I compute a univariate analysis (t-test and Wilcoxon test of difference in median and means, respectively). Table shows that the mean and median financial health of firms with non-elite network social capital-Oxbridge and elite network social capital-Oxbridge is significant at the 1% level. This result implies that firms with more elite network social capital-Oxbridge have better financial health compared to non-elite network social capital-Oxbridge firms. Further, I notice that most elite network social capital-Oxbridge do not have higher academic qualifications in comparison to the non-elite network social capital-Oxbridge. Also, I notice that firms with more elite network social capital-Oxbridge have a larger global elite network. Further, I observe that CEOs from elite network social capital-Oxbridge backgrounds manage older and bigger firms in comparison to CEOs from non-elite network social capital-Oxbridge backgrounds. The above factors may account for the reason why CEOs from elite network social capital-Oxbridge backgrounds are relatively successful. Table 44 show my univariate analysis results for elite social network capital.

Table 4. 16 Univariate analysis

Variable	Non Elite network social capital-Oxbridge			Elite network social capital-Oxbridge				
	Obs.	Mean	median	Obs.	Mean	median	t-statistics	Wilcoxon
Z-Score	1649	5.327	3.419	349	5.820	3.526	-0.493	-4.072***
R&D intensity	1442	1.412	0.001	310	2.593	0.001	-1.181**	-1.521
Academic Education	1953	1.871	1.792	463	1.587	1.792	0.284***	9.767***
Industry Specific Experience	2139	2.017	2.079	521	1.899	2.079	0.118***	3.581***
Elite Network	2012	1.413	1.609	506	1.614	1.609	-0.201***	-9.025***
Tobin's Q	1798	1.798	1.426	451	2.465	1.431	-0.667*	-0.420
Return Volatility	1934	0.0431	0.024	464	0.0721	0.025	-0.0289***	-4.3182***
Firm Size (Ln)	2101	8.008	7.771	496	8.237	7.760	-0.230*	-0.5621***
Firm Age (Ln)	1889	0.948	1.080	467	1.007	1.091	-0.0594*	-4.167***
Debt to Equity ratio	1787	104.7	58.575	416	124.8	58.947	-20.12*	-1.227
Cash ratio	1803	0.908	0.286	371	0.489	0.280	0.419***	2.2194**

Z-Score; Results shows firms with higher Elite network social capital-Oxbridge are associated with high financial health, **Education**; Most Elite network social capital-Oxbridge do not have PhDs; **Elite Network**; Elite network social capital-Oxbridge have the highest elite network; **Return Volatility**; Volatility of Market return is higher in Elite network social capital-Oxbridge; **Total Assets**; Elite network social capital-Oxbridge control lager firms, **Firm Age**; Elite network social capital-Oxbridge firms are older with lower CEO turnover, **Debt to Equity ratio**; Debt to Equity ratio is smaller in Elite network social capital-Oxbridge firms are less liquid compared to non-Elite network social capital-Oxbridge.

I also include in my study a further analysis of R&D intensity by each sector involved in my dataset. The results for this analysis are included in table (11) below.

4.14.8 Regression Equations

For the pooled OLS robust models equations for the accounting-based and managerial attributes bankruptcy model:

$$CorpRisk_t = \beta_0 + \beta_1\,flbv_t + \beta_2\,mlbv_t + \beta_3\,controlvar_t + \varepsilon_t \qquad \text{(Eq 1)}$$

$$CorpRisk_t = \beta_0 + \beta_1\,aggmod_t + \beta_3\,controlvar_t + \varepsilon_t \qquad \text{(Eq 2)}$$

$$CorpRisk_t = \beta_0 + \beta_1\,flbv_t + \beta_2\,mlbv_t + \sum k = 1 + \gamma_k\,controlvar_t + \omega_t + \omega i_t + \varepsilon i_t$$

(Eq3)

$$CorpRisk_t = \beta_0 + \beta_1\,aggmod_t + \sum k = 1 + \gamma_k\,controlvar_t + \omega_t + \omega i_t + \varepsilon i_t \quad \text{(Eq 4)}$$

Where $CorpRisk_t$ represents bankruptcy risk measured first by the Altman Z-score (financial health) at time *t*, and second, measured by the standard deviation of stock market return volatility; β_0 is the constant term; β_1 is my coefficient; *flbv* is the firm level variables; *mlbv* is the

managerial level variables and *controlval* represents my control variables; γ_k measures the estimable slope term and ω_t represents the unobserved and time-invariant firms effects. Fixed effects including the industry group the firms operate in; ωi_t is for time specific effects that has a potential effect on all firms within the industry; εi_t is the error term that is time-varying and serially uncorrelated with the mean of the variance and control variables.

In the first half of chapter four I measure corporate risk using the Altman Z-score in the second half I measure corporate by using the standard deviation of stock market return volatility. My results are quite similar and consistent after testing my hypothesis, except for TMT education and TMT experience. In the situation with TMT education and TMT experience, I observe mixed results (- and +); however, the sign changed to (-) after interacting with either elite network social capital or TMT innovativeness.

4.14.9 Conclusion

This study provides a novel perspective on the theoretical arguments related to the combinations of managerial abilities and firm level data to mitigate bankruptcy risk. My study is one of the first to examine empirically the combinations of managerial attributes in each three major bankruptcy models to predict bankruptcy probability. The results from my study show that one of the major causes of the largest corporate failures (which eventually caused the 2007/2008 global financial crisis) is top executive fraud. Thus, TMT accounting malfeasance constitutes the greatest threat to most corporate failures. Yet little attention has been accorded to managerial attributes when examining bankruptcy risk. My study has created an awareness to policy makers and future researchers to consider the managerial attributes, such as experience (industry-specific, firm-specific and general experience), TMT innovativeness and education background, as a key element in predicting bankruptcy risk. Further, this study extends the bankruptcy risk literature by introducing other unique managerial attributes such as elite network social capital-Oxbridge and elite network social capital into the bankruptcy prediction models. My study shows that combination of a traditional accounting model with market level data and managerial attributes provides the best predictive results for bankruptcy compared to merely the traditional accounting-based model or the market-based model. Further, my study introduced new concepts, such as

executive prestige, trust and executive decision making pathways, as key issues that should be considered by future researchers of bankruptcy risk. Trust is an important component of all business transactions. Managerial behaviour, investor behaviour and other stakeholder behaviour are conditioned by trust. Therefore, I recommend that future researchers examine further the trust issues that affect bankruptcy risk.

CHAPTER 5   **Summary findings**

In My first empirical chapter, I observed that strategic cognition that gives priority to TMT education background alone does not provide significant contributions to corporate value or financial health. However, when education is combined with industry-specific or firm-specific experience, the strategic cognition of executives can lead to positive effect on corporate health and value. The positive contribution of strategic cognition is even more salient when TMT members increase their risk preferences by investing in more innovative ideas that can be observed from R&D activities (i.e., high risk appetite and high innovativeness). These findings are crucial to the recruitment and selection of employees for organizations as well as training and development arranged by human resources departments.

I noticed in my sample that most TMT members are partners to their professional bodies. As partners, they continue to develop their tacit knowledge and firm-specific skills which ultimately benefit the company. Further, partners mostly maintain close contacts with the top echelons of the professional bodies which give them access to extra cognitive skills that can be utilized during TMT strategic cognition process in the boardroom. This study considers also the reverse causality and examines the relationship between past performance of the firms in the market and their financial soundness. Overall, this study provides supporting evidence for the dynamic capability theory, the upper echelon theory as well as the resource-based and knowledge-based views.

In the second empirical chapter I examined whether audit committee (AC) attributes make a difference to corporate performance and firm value both in times of adverse exogenous shocks and stable times. I examine ranges of AC attributes including their academic education, professional education, general experience, industry-specific experience, firm-specific experience, AC chair experience and AC chair education background. Further, I combined AC attributes with accounting information, CSD and executive information to

examine their impact on corporate performance and firm value. Most of the previous corporate governance literature relates to periods of economic stability. This study is the first that uses PLS-SEM to examine AC attributes, executive compensation, CSD and accounting information for both periods simultaneously in one study.

The results from this study shows that the positive association between finance experts (both accounting and non-accounting finance experts) and firm value is lower with firms that have lower CSD disclosure during both periods of economic instability and stable times. However, the results for both periods of instability and stable periods improved significantly when I included CSD. Further, I observed a significant positive firm value when I excluded non-accounting finance expert but included accounting certified financial expert, AC chair experience and CSD in the model. This result implies that accounting certified finance experts together with CSD enhances investors trust and confidence about firms during both periods of instabilities and stable periods. In addition, I noticed a positive association between accounting certified finance expert and firm value during both periods of instability and stable periods compared to the non-accounting finance expert that was positive only during stable times.

This thesis provides a novel perspective of the theoretical arguments related to the combinations of managerial abilities and firm level data to mitigate bankruptcy risk. This study is one of the first that examines empirically the combinations of managerial attributes to each three major bankruptcy models to predict bankruptcy probability. The results from this studies show that the major causes of the biggest corporate failures- (which eventually caused the 2007/8 global financial crisis- is top executive fraud. Thus, TMT accounting malfeasance constitutes the biggest threat to most corporate failures. Yet little attention has been accorded to managerial attributes when examining bankruptcy risk. This thesis has created awareness to policy makers and future researchers to consider the managerial attributes such as experience (industry-specific, firm-specific

and general experience), TMT innovativeness and education background, as key elements for predicting bankruptcy risk. Further, this study extends bankruptcy risk literature by introducing other unique managerial attributes such as Oxbridge affiliation and elite network social capital into the bankruptcy prediction models. The results from this study shows that the combinations of traditional accounting models with market level data and managerial attributes provide the highest predictive results for bankruptcy compared to just traditional account model or the market model. Further, this study introduced new concepts such as executive prestige, trust, and executive decision making pathways as key issues that should be considered by future researcher of bankruptcy risk.

5.1   Practical implications

The findings from this study provide valuable information to policy makers, mangers, researchers and investors. The practical implications of this study can be summarised under three key sub headings; people, process and strategy. In the area of people, this study provides key managerial attributes that has to be prioritised by human resources department during selection and recruitments exercise. First, people in organisations especially the top executive team members constitutes the greatest assets of every organisations. TMT's represents the 'mind and eyes' of the organisations. Like a human body, a bad mind and bad eyes are recipe for disaster. Second process in organisations provide the road map for value creations. Therefore wrong processes implies that policies, procedures structures are defective and inefficient. Further, inefficient processes provide breeding grounds for fraudulent behaviours and accounting malfeasance. This study provide empirical evidence that link effects of earnings management and fraud on firms outcomes. The findings from this study implies that, experienced audit committee chair is crucial for a better organisational processes and financial reporting quality. Third, regarding strategy, this study highlight that combinations of relevant TMT experience

and social networking enhances cognitive abilities of top executives during strategic decision making.

5.2 Implications to decision makers (firm level):

5.2.1 Strategy

The upper echelons theory posits that TMT background characteristics determines the firm's strategic directions, profitability, competitiveness and sustainability. However, there are mixed results regarding the relationship between TMT attributes and a firm's outcome because previous studies have either used conceptual framework to examine the selection of TMT attributes or relied on traditional OLS regression for their findings. I contribute to the literature by using a throughput decision making model with PLS-SEM to provide empirical evidence. This study simultaneously combines key TMT cognitive attributes (education, experience, TMT innovativeness, and risk preference) with accounting information to provide empirical evidence to support the findings in this study. I observed that a combination of education and experience provides a positive outcome. Further, combinations of experience, high risk preference and innovativeness provide even more robust results.

This study provides valuable information about the different trust pathways that can be used to examine TMT dominant trust position. The different pathway can be examined further by computer modelling to provide valuable information about TMT's dominant behaviour during strategy formulation.

Further, the results from this study implies that highly qualified TMT's can provide positive outcomes during strategy formulations when their ideas are combined with industry-specific or firm-specific experience. Education provides knowledge and guide TMT understanding of their strategic environment. Experience on the other hand provides TMT's with awareness about their strategic environment and refocuses their strategic lens

to achieve better outcomes. Therefore, combinations of education and experience (especially industry-specific and firm-specific experience) are pivotal when making strategic choices.

5.2.2 Risk management

Regarding risk management, this study provides empirical evidence which shows that executives who have higher risk appetite to initiate innovative project can provide positive outcomes to their firms. I find that current TMT characteristics including risk appetite and innovation capabilities as well as strategic cognition quality are sensitive to the previous year's corporate financial performance and firm value. Namely, corporate managers can alter their risk appetite level and initiate projects with more innovative ideas if they notice that their firm is doing very well financially. Further, I observed that one of the greatest risks faced by most firms is the executive's fraud. Using the fraud triangle theory, this study linked the top fifteen global accounting scandals involving senior executive fraud with the trust decision making pathways. The conceptual framework of this study provides management with a better understanding of the opportunities, motivation and perception of the fraudsters and the dominant positions used by the fraudsters. This can help management in developing policies to minimise fraud.

5.2.3 Fraud prevention

Financial statement fraud represents one of the greatest challenges facing most corporate entities and the global economy. Tracking the complicated trajectories of high profile fraud and the bewildering array of emerging cyber fraud requires an in depth understanding of the behavioural dynamics of the fraudster. I observed that, financial statement fraud undermines the integrity and quality of the financial reporting process and diminishes the confidence of the capital market as well as market participants' .This study extends the fraud triangle theory by attempting to provide highlight regarding the mental frames of the fraudster. I posit that, it is the perception of the fraudster and

available information that influences their behaviour. For example the pressure/motivation to commit fraud is influenced by the perception of the fraudsters together with the type of information available at the particular time period. Further, opportunity to commit fraud is conditioned by the fraudster's perception as well as the information type (complete, incomplete, reliable, unreliable etc.).I combined the fraud triangle theory with the throughput decision making framework in table 3.2 to capture the six possible dominant pathways used by fraudsters in committing fraud. The framework use in this study can be modelled (using computer program) to enable mangers, policy makers etc. identify/monitor/reduce fraudulent behaviours in organisations.
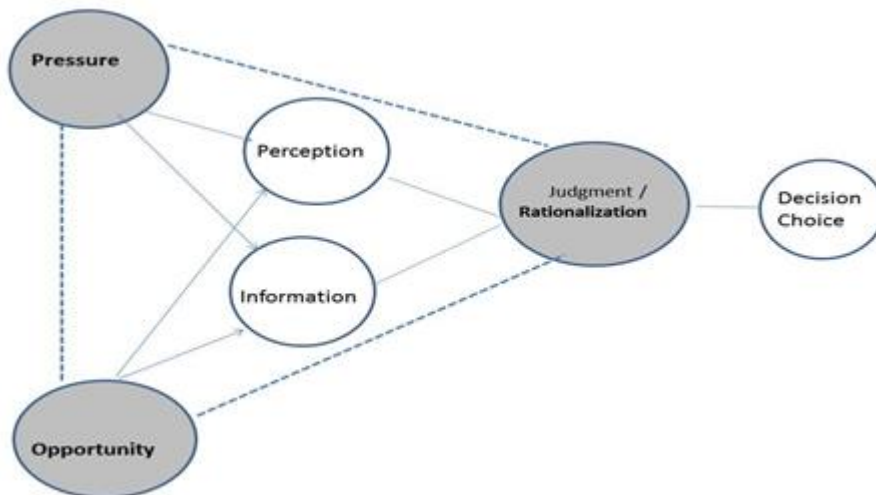
5.2.4 Human resources and recruitment

The findings from this study shows that firm's specific experience and industry-specific experience combined with high academic qualification is beneficial to firms. This implies that recruitment and selection processes should prioritise executives who have both high qualifications as well as industry and firm related experience. Further, I observed that managerial prestige combined with industry-specific experience has a significant negative association with bankruptcy risk probabilities. This implies that firms that are

going through bankruptcy may be able to 'turn things around' if they employ an experienced CEO from elite background. I observed that the positive association between accounting certified financial experts and firm value is higher during periods of uncertainties than stable times. This results provides valuable information to firms that want to recruit AC members especially during periods of uncertainties to prioritise recruiting accounting certified financial experts.

5.2.5   Networking-social capital

The results from this study implies that networks are embedded with cognition-based trust because members in aforementioned elite network benefits from superior knowledge resources and expertise advise about the industry in which the firm operates and firm-specific problem solving recommendations. As a reflection, my analyses show that such contacts and networks strengthen the positive association between strategic cognition and firm outcomes. They also strengthen the positive effects of firm-specific experience that already provides better contributions compared to general experience. Hence, the results show that the structure and content of elite network group can offer managers with superior information that can support TMT strategic cognition to produce positive significant outcomes. Similarly, the risk preference and innovativeness of TMT show stronger effects on financial health and market value of the firms when professional and academic qualifications from reputable institutions are considered together.

5.2.6   Corporate sustainability disclosure (CSD)

I observed that the positive association between CSD and firm value is high in both crisis periods and stable times. My results are consistent with legitimacy theory that implies that in order to continue operating successfully, firms must act within the bounds of what investors and other stakeholders identify as socially acceptable. Further, CSD enhances

trust relationship between the firm and users of accounting information. I hence suggest that CSD should be mandatory in the IIRC (2013) framework.

5.2.7 Prospective investors

The findings from this study shows that TMT cognitive attributes, audit committee attributes and elite network social capital combined with accounting and market information can provide a valuable source of information to investors. These findings extend the literature on integrated reporting by providing empirical evidence about the relationships between TMT attributes (human capital) and corporate financial performance and firm value. This results are consistent with the information asymmetry theory that implies that imbalance of information between directors and investors can lead to lower firm value. Moreover, I observed that investors trust and confidence in firms are enhanced when they are provided with adequate information regarding the demographic background of TMT's in addition to accounting information. Further, I observed that the positive association between corporate sustainability disclosures and firm value is high during both volatile and stable periods. The results from this study show that CSD is one of the governance attributes that matters most for investors during both periods of uncertainties and stable times. This result implies that TMT's can improve the trust relationship between their firms and investors if their financial statement include information regarding corporate sustainability.

5.2.8 Regulators

This study identifies poor monitoring of accounting transactions and poor regulatory systems as one of the key cause of the 2007/8 global financial crisis. I observed that the combination of accounting certified finance expert on AC with CSD provides a significant and positive association with firm value. This result implies that the accounting certified financial expert contributes positively to the quality of financial reporting, monitoring of fraud, risk management and thus enhances performance. As a

consequence, to be able to strengthen the monitoring and oversight responsibilities of the AC, all stock market regulators worldwide should ensure that all ACs have at least one accounting certified financial expert. Further, corporate sustainability disclosure should be mandatory to provide stakeholders with adequate information about CSD.

5.2.9   Academic contributions

One of the key problems identified in the implementation of the IIRC (2013) framework is the categorisation of capitals. Previous studies have identified capital categorisation as the main obstacle in the IR implementation. However, nor empirical research has have been done so far to contribute to the IR discourse. This study provide synthesises the awareness of researchers by providing empirical evidence that support TMT as a key driver of firms value creation process. The study also attempted to provide potential answers to problems associated with intangibles assets classifications in firm by highlighting on key corporate governance capitals (CGC). These value creation intangibles includes; TMT's cognitive capabilities (TMTSC), TMT risk preferences, TMT innovativeness, Elite social capital and other network relationships, AC attribute etc. The primary aim of IR is to explain to investors and stakeholders how organisations use their capitals (tangible and intangibles) to create value over short term, medium term and long term. Among the key findings in this study is that intellectual capabilities of TMT's alone cannot secure maximum outcomes for firms. Rather, it is when TMT combines their intellect with relevant experience and innovativeness when value creation is maximised. Therefore I suggest IIRC (2013) framework has to be expanded to include TMT capitals (thus firms have to highlight their intangible capitals such as TMT education background, TMT relevant experience, TMT elite network and social relationship, TMT risk appetite and TMT innovativeness) as part of their IR . Further, the governance section of the IR has to highlight AC attributes especially the number of accounting certified finance experts in the firm, AC chair experience, elite network social

capital and CSD. In addition, the CSD and corporate risk sections in the IR had better provide detailed information about opportunities and risk in the organisations.

The results from this study provide another perspective to future researchers of bankruptcy risk. Thus, combinations of TMT cognitive attributes, audit committee attributes and elite network social capital provide a better prediction to bankruptcy risk. Trust pathways use in this study provide a better understanding of the dominant trust positions used by TMT during strategy formulation. Further, each trust pathways provides different outcomes thereby providing managers with better information about optimisations. The outcomes from this study can be use by future researchers to investigate which particular trust pathways secures maximum outcomes to firms.

This study provides a simplified version of the six capitals showed in the IIRC (2013) framework by providing just three key capitals for firms including; people, process and social capital this is showed in figure 5.1 below
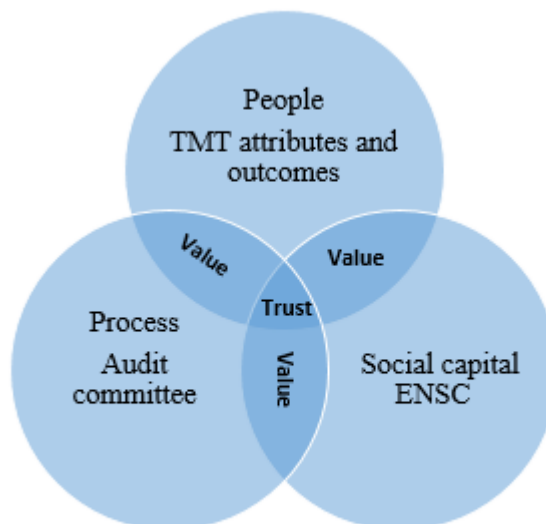
Source: Author- Suggested new definition of firm capitals

Figure 5. 1 Authors classification of three key capitals of firms

5.3 Limitations and future research

Limitations and future research

There are few limitations to this study that can provide opportunities for future research. First, the UK was selected as the empirical setting for my study because UK has one of the world's largest and most influential stock exchanges in terms of market value and liquidity. Further, the demographic characteristics (e.g., educational and experience) of TMTs included in my data set provide a better representation of the most competitive TMTs in the executive labour market in the world. In addition, previous empirical studies on TMT characteristics and firm outcomes have concentrated mainly on the US, thereby confining our understanding to only one geographical setting. Irrespective of the above reasons, I recommend that future research compare results across countries.

Further, to the best of my knowledge, this study is the first to use PLS-SEM to examine the effects of elite network social capital (Oxbridge and elite global network) on firm value. While Oxbridge and elite global network are powerful analytical constructs, the dataset for these constructs are limited to TMTs that obtain their education from the top 100 universities around the world. I recommend that future researchers increase the number to perhaps the top 200 or more to provide a detailed analysis and information about the effect of elitism on firm outcomes.

Further, future research can examine more methodically i) through which mechanism having social networking skills can help TMTs contribute further to the financial performance of their firms, and ii) why academic education and general experience in isolation would not be beneficial for corporate outcomes.

Finally, from a conceptual and theoretical standpoint, I observe that trust plays a pivotal role in all managerial behaviours and firm outcomes. However, I have not been able to

provide empirical evidence to support my observations. Therefore, I recommend that future researchers conduct robust empirical studies regarding the effects of trust on corporate performance.

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Appendices

Appendix 1 Indicators/construct reliability test -model 3

Latent construct	Indicators	Convergent validity				Internal consistency reliability	
		Loadings >0.70	t-value for loadings	Indicator reliability >0.50	AVE >0.50	Composite reliability [0.60-0.90]	Cronbach Alpha [0.60-0.90]
TMT education	Academic education	0.748	6.134	Yes	0.637	0.817	0.758
	Professional education	0.840	13.048	Yes			
TMT experience	Supervisory experience	0.799	12.672	Yes	0.668	0.826	0.792
	Industry-specific experience	0.875	15.231	Yes			
	Firm-specific experience	0.895	16.324	Yes			
TMT risk preference	Delta	0.889	15.986	Yes	0.706	0.873	0.834
TMT innovativeness	R&D to sales	0.877	15.348	Yes	0.685	0.802	0.768
TMT strategic cognition	TMT education & TMT experience	0.895	16.324	Yes	0.699	0.844	0.776
Profitability	Return on equity	0.891	16.201	Yes	0.704	0.868	0.818
	Return on assets	0.895	16.324	Yes			
Liquidity	Current ratio	0.875	15.631	Yes	0.668	0.826	0.792
	Cash ratio	0.845	14.210	Yes			
	Quick ratio	0.865	15.124	Yes			
Leverage	Debt to equity	0.902	17.231	Yes	0.712	0.877	0.842
	Debt to assets	0.849	14.652	Yes			
Efficiency	Assets turnover	0.899	17.103	Yes	0.734	0.889	0.863
	Sales to assets	0.908	19.148	Yes			

Notes: *TMT strategic cognition* is the linear combination of five indicators based on the constituents of *TMT experience* and *TMT education*. AVE stands for average variance extracted. These results are only for model 3 in Table 3 about PLS results. As a results of words count restrictions, we only reported validity and construct reliability tests results for model 3

Appendix 2 Indicators/construct reliability test model 6

Latent construct	Indicators	Convergent validity				Internal consistency reliability	
		Loadings >0.70	t-value for loadings	Indicator reliability >0.50	AVE >0.50	Composite reliability [0.60-0.90]	Cronbach Alpha [0.60-0.90]
TMT education	Academic education	0.877	15.231	Yes	0.717	0.817	0.747
	Professional education	0.849	13.048	Yes			
TMT experience	Supervisory experience	0.768	12.672	Yes	0.658	0.826	0.790
	Industry-specific experience	0.876	15.231	Yes			
	Firm-specific experience	0.895	16.324	Yes			
TMT risk preference	Delta	0.860	15.987	Yes	0.716	0.873	0.844
TMT innovativeness	R&D to sales	0.867	15.348	Yes	0.675	0.802	0.768
TMT strategic cognition	TMT education & TMT experience	0.897	16.328	Yes	0.719	0.844	0.767
Profitability	Return on equity	0.898	16.221	Yes	0.745	0.868	0.828
	Return on assets	0.895	16.324	Yes			
Liquidity	Current ratio	0.865	15.631	Yes	0.668	0.826	0.793
	Cash ratio	0.875	14.210	Yes			
	Quick ratio	0.855	15.124	Yes			
Leverage	Debt to equity	0.902	17.231	Yes	0.712	0.877	0.844
	Debt to assets	0.859	15.692	Yes			
Efficiency	Assets turnover	0.899	17.103	Yes	0.734	0.889	0.867
	Sales to assets	0.912	19.749	Yes			

Notes: *TMT strategic cognition* is the linear combination of five indicators based on the constituents of *TMT experience* and *TMT education*. AVE stands for average variance extracted. These results are only for model 3 in Table 3 about PLS results. As a results of words count restrictions, we only reported validity and construct reliability tests results for model 9

Appendix 3 Indicators/construct reliability test model 9

Latent construct	Indicators	Convergent validity				Internal consistency reliability	
		Loadings >0.70	t-value for loadings	Indicator reliability >0.50	AVE >0.50	Composite reliability [0.60-0.90]	Cronbach Alpha [0.60-0.90]
TMT education	Academic education	0.897	16.304	Yes	0.727	0.817	0.744
	Professional education	0.859	15.986	Yes			
TMT experience	Supervisory experience	0.855	15.124	Yes	0.758	0.826	0.793
	Industry-specific experience	0.877	15.231	Yes			
	Firm-specific experience	0.895	16.324	Yes			
TMT risk preference	Delta	0.859	15.986	Yes	0.716	0.873	0.844
TMT innovativeness	R&D to sales	0.867	15.348	Yes	0.677	0.802	0.768
TMT strategic cognition	TMT education & TMT experience	0.894	16.324	Yes	0.709	0.844	0.766
Profitability	Return on equity	0.891	16.201	Yes	0.705	0.868	0.828
	Return on assets	0.895	16.324	Yes			
Liquidity	Current ratio	0.865	15.631	Yes	0.778	0.826	0.793
	Cash ratio	0.897	16.504	Yes			
	Quick ratio	0.855	15.124	Yes			
Leverage	Debt to equity	0.902	17.231	Yes	0.712	0.877	0.844
	Debt to assets	0.849	14.652	Yes			
Efficiency	Assets turnover	0.859	15.986	Yes	0.734	0.889	0.867
	Sales to assets	0.908	19.148	Yes			

Notes: *TMT strategic cognition* is the linear combination of five indicators based on the constituents of *TMT experience* and *TMT education*. AVE stands for average variance extracted. These results are only for model 3 in Table 3 about PLS results. As a results of words count restrictions, we only reported validity and construct reliability tests results for model 6

Appendix 4 Construct validity test -during GFC

Table A1. Assessment of the indicators: validity and Construct reliability tests During financial crisis							
Latent construct	Indicators	Convergent validity				Internal consistency reliability	
(Latent variable)	(Measurement indicator)	Loadings >0.70	T-Value	Indicator reliability >0.50	AVE >0.50	Composite reliability [0.60-0.90]	Cronbach Alpha [0.60-0.90]
Accounting Finance Expert	Qualified Accountants	0.795	6.453	Yes			0
	Partner, FCA, FCIMA, etc.	0.889	15.986	Yes	0.657	0.846	0.812
Non Accounting Finance Expert	Supervisory Executive directors	0.869	15.324	Yes	0.674	0.824	0.799
Sustainability Disclosure	GRI Sustainability Score	0.917	20.243	Yes	0.721	0.899	0.846
Executive Compensation	Total executive Compensation	0.889	15.986	Yes			
	Average Executive Compensation	0.897	16.932	Yes	0.684	0.843	0.803
Audit committee Chair	Chairman of Audit Committee	0.902	19.124	Yes	0.723	0.887	0.827
Profitability	Return on equity	0.899	17.103	Yes			
	Return on assets	0.887	15.872	Yes	0.692	0.832	0.801
				Yes			
Liquidity	Current ratio	0.921	23.124	Yes			
	Cash ratio	0.896	16.453	Yes			
	Quick ratio	0.869	15.324	Yes	0.714	0.892	0.835
Leverage	Debt to equity	0.899	17.103	Yes			
	Debt to assets	0.924	23.678	Yes	0.722	0.864	0.823
Efficiency	Assets turnover	0.902	19.124	Yes			
	Sales to assets	0.895	16.143	Yes	0.718	0.838	0.809

Notes: *Qualified Accountants* includes; ACCA, CPA, CFA, CIMA. *Supervisory Executive Directors* includes CEO's, Managing directors, chairman, and Presidents. AVE stands for average variance extracted. These results are only for model (1) in Table 3 about PLS results. The results for the other models are available on request.

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Appendix 5 Construct validity test-post GFC

Table A1. Assessment of the indicators: validity and Construct reliability tests							
Latent construct	**Indicators**	**Convergent validity**				**Internal consistency reliability**	
(Latent variable)	(Measurement indicator)	Loadings >0.70	T-Value	Indicator reliability >0.50	AVE >0.50	Composite reliability [0.60-0.90]	Cronbach Alpha [0.60-0.90]
Accounting Finance Expert	Qualified Accountants	0.896	16.453	Yes			
					0.639	0.886	0.792
	Partner, FCA, FCIMA, FCPA etc.	0.915	20.164	Yes			
Non Accounting Finance Expert	Supervisory Executive directors	0.889	15.986	Yes	0.632	0.872	0.785
Sustainability Disclosure	GRI Sustainability Score	0.918	22.746	Yes	0.674	0.889	0.795
Executive Compensation	Total executive Compensation	0.879	15.650	Yes			
	Average Executive Compensation	0.887	15.872	Yes	0.627	0.865	0.783
Audit committee Chair	Chairman of Audit Committee	0.895	16.143	Yes	0.634	0.879	0.791
Profitability	Return on equity	0.923	23.450	Yes			
	Return on assets	0.897	16.932	Yes	0.680	0.891	0.796
				Yes			
Liquidity	Current ratio	0.909	20.097	Yes			
	Cash ratio	0.921	23.676	Yes			
	Quick ratio	0.879	15.940	Yes	0.720	0.894	0.799
Leverage	Debt to equity	0.887	15.872	Yes			
	Debt to assets	0.923	23.278	Yes	0.695	0.890	0.789
Efficiency	Assets turnover	0.918	22.024	Yes			
	Sales to assets	0.921	22.973	Yes	0.725	0.897	0.799

Notes: *Qualified Accountants* includes; ACCA, CPA, CFA, CIMA. *Supervisory Executive Directors* includes CEO's, Managing directors, chairman, and Presidents. AVE stands for average variance extracted. These results are only for model (1) in Table 3 about PLS results. The results for the other models are available on request.

Appendix 6 Corporate bankruptcy risk summary observations

Variable	Measurement/hypothesis	Source	Result
R&D intensity	Highly innovative firms have less probability of bankruptcy risk all things been equal	Bloomberg	✓
ENSC-Oxbridge	A firm that has more TMT's from elite university education background has lower probability of bankruptcy risk	Handpicked data	?
Academic Education	A firm that has TMT's with high academic education background has lower probability of bankruptcy risk.	Handpicked data	X
Professional Education	A firm that has TMT's with high professional education background has lower probability of bankruptcy risk.	Handpicked data	X
Industry specific experience	A firm that has TMT's with high industry specific experience background has lower probability of bankruptcy risk.	Handpicked data	?
Tobin's Q	A firm that has higher market value coupled with high cash flows has less probability of bankruptcy risk.	Bloomberg	✓
Z-Score	A firm that has good financial health has a lower probability of corporate bankruptcy risk.	Bloomberg	✓
Volatility of market returns (SD)	A firm that has a higher volatility of market returns has higher probability of bankruptcy risk.	Bloomberg	✓
ROA	A firm that can generate a higher returns on its assets has a lower probability of bankruptcy risk.	Bloomberg	✓
Current ratio	A firm that has a high current ratios has a lower probability of bankruptcy risk all things been equal.	Bloomberg	✓
Cash ratio	A firm that has a high cash ratios has a lower probability of bankruptcy risk all things been equal.	Bloomberg	✓
Debt to equity ratio	A firm that has a high leverage has higher probability of bankruptcy risk	Bloomberg	✓
Efficiency ratio	A more efficient firm (operational efficiency) has lower probability of bankruptcy risk	Handpicked data	✓
R&D intensity x Academic education	A firm that has highly educated TMTs who support high R&D spending has lower probability of bankruptcy risk.	Handpicked data	✓
R&D intensity x ACFE	A firm that has more accounting certified finance experts who support high R&D spending has lower probability of bankruptcy risk.	Handpicked data	✓
R&D intensity x ENSC-Oxbridge	A firm that has more TMT's from Oxbridge background who support high R&D spending has lower probability of bankruptcy risk.	Handpicked data	✓
R&D intensity x Elite social capital	A firm that has TMT's from the top best 100 universities in the world that support high R&D spending has lower probability of bankruptcy risk.	Handpicked data	✓
R&D intensity x Industry Spec. experience	A firm that has more TMT's with industry specific experience that support high R&D spending has lower probability of bankruptcy risk.	Handpicked data	✓
Firm Size (Ln)	Larger firms usually have lower probability of bankruptcy risk because of their resource capabilities.	Handpicked data	✓

Appendix 7 Suggested IR framework with business model build around people, process, and risk