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Exploring the Fit Between Top Management Team, Management Control and Business Strategy

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ABSTRACT

The world is continuously changing, and in order to survive firms and organisations must adapt to those changes by updating their purpose or objective and how they intend to achieve it. Appropriate controls and structures are applied to reach the intended goals. Management controls are the processes and practices managers use to influence the behaviour of individuals and groups move towards the pre-set objectives and goals of the organisation. Management selects the appropriate combination of these controls to form a management control system (MCS). In summary, the top management is expected to generate a business strategy to adapt to the changing environment and implement it with an MCS. This dissertation investigates the effect of the top management team (TMT), MCS type and business strategy on firm performance.

The samples for the three articles in the dissertation were firms listed in Finland in the period 2008−2015. Top management demographic and firm financial data were collected from annual reports and a financial database. Article 1 applied structural equation modelling to test the hypothesised relationships between the TMT and firm performance variables. Article 2 applied cluster analysis to group firms applying similar MCSs. Objective indicators and a ranking method were applied in Article 3 to measure and identify business strategies. Analysis of variance and the post-hoc multiple comparison procedure were used to examine the differences in the variable means between the MCS-type clusters.

This dissertation makes several contributions to the business strategy and management control literatures. First, the results suggest that the TMT's demographic properties are reflected in firm performance. The effect can be positive or negative depending on the TMT's task, that is, the organisation's business strategy. The results also imply the demographic properties of the TMT reflect the organisation and control types enabling the identification of organisation-level MCS archetypes. Lastly, the organisation-level MCS archetypes characterise the different types of management controls used within the organisation, and the results suggest that aligning an organisation's business strategy with the MCS type improves performance.

Keywords: management control system, top management team, business strategy, performance

TIIVISTELMÄ

Maailma muuttuu jatkuvasti ja selviytyäkseen yritysten ja organisaatioiden täytyy sopeutua muutoksiin päivittämällä tarkoituksensa tai päämääränsä ja miten se aiotaan saavuttaa. Tarkoituksenmukaisia kontrolleja ja rakenteita käytetään saavuttamaan aiotut tavoitteet. Johdon kontrollit ovat ne prosessit ja käytännöt, joilla johto vaikuttaa yksilöiden ja ryhmien käyttäytymiseen pyrittäessä kohti organisaation ennalta asetettuja tavoitteita. Johto valitsee tarkoituksenmukaisen yhdistelmän näitä kontrolleja muodostaakseen johdon ohjausjärjestelmän. Siten johdon oletetaan kehittävän kilpailustrategian sopeutuakseen muuttuvaan ympäristöön ja toteuttavan sen johdon ohjausjärjestelmällä. Tämä väitöskirja tutkii johtoryhmän, johdon ohjausjärjestelmän ja kilpailustrategian vaikutusta yrityksen suorituskykyyn.

Väitöskirjan kolmen artikkelin näytteet koostuivat suomalaisista pörssinoteeratuista yrityksistä vuosilta 2008–2015. Johtoryhmien demografiset ja yritysten taloustiedot kerättiin vuosikertomuksista ja yritystietokannasta. Artikkelissa 1 testattiin johtoryhmä- ja yrityksen suorituskykymuuttujien oletettuja suhteita käyttäen rakenneyhtälömallia. Artikkelissa 2 käytettiin klusterianalyysiä ryhmittelemään yritykset, jotka käyttivät samankaltaisia johdon ohjausjärjestelmiä. Artikkelissa 3 tunnistettiin yritysten kilpailustrategiat niiden taloudellisten talouslukujen avulla. Varianssianalyysiä ja post-hoc -testiä käyttäen tutkittiin eri kilpailustrategioiden ja johdon ohjausjärjestelmien suorituskyvyn eroja.

Väitöskirja antaa lisätietoa kilpailustrategian ja johdon ohjauksen tutkimusalalle. Tulokset osoittavat, että johtoryhmän demografiset ominaisuudet heijastuvat yrityksen suorituskykyyn. Vaikutus voi olla positiivinen tai negatiivinen riippuen johtoryhmän tehtävästä eli organisaation kilpailustrategiasta. Tulosten mukaan johtoryhmän demografiset ominaisuudet heijastelevat organisaation ja sen johdon ohjausjärjestelmän tyyppiä, mikä mahdollistaa organisaatiotason johdon ohjausjärjestelmätyyppien tunnistamisen. Johdon ohjausjärjestelmätyypit kuvaavat organisaatiossa käytettäviä erilaisia johdon ohjauksen menetelmiä ja tulokset viittaavat siihen, että kilpailustrategian ja johdon ohjausjärjestelmätyypin yhteensovittaminen parantaa suorituskykyä.

Avainsanat: johdon ohjausjärjestelmä, johtoryhmä, kilpailustrategia, suorituskyky

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ABBREVIATIONS

ABC	Activity-based costing
ANOVA	Analysis of variance
ATO	Asset turnover
BSC	Balanced score card
CEO	Chief executive officer
CFO	Chief financial officer
CMO	Chief marketing officer
CVF	Competing values framework
MAS	Management accounting system
MC	Management control
MCS	Management control system
MIS	Management information system
NPPE	Net property, plant, and equipment
PM	Profit margin
RNOA	Return on net operating assets
ROA	Return on assets
ROI	Return on investment
SEM	Structural equation modelling
SMA	Strategic management accounting
TCE	Transaction cost economics
TMT	Top management team

FIGURES

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ORIGINAL PAPERS

1 INTRODUCTION

1.1 Preface

Contingency theory has been used extensively in management accounting research, but top management team (TMT) theory and contingency theory are rarely combined in management accounting research. While TMT theory-based research overlooks the role of management control in explaining organisational performance, management accounting research examines the relationship between strategy and management control but tends to disregard the role of the properties of the top management in explaining organisational performance. This dissertation is set out to explore the overall system of top management properties, business strategy and management controls in use.

The world is continuously changing, and firms and organisations must adapt to these changes in order to survive. Organisations need to update their purpose or objective and how they intend to achieve it. Most organisations are in a continuous process of assessing their purposes by questioning, ensuring, and redefining how they interact with their environments. Similarly, most organisations must constantly change and improve the mechanisms used to achieve their objectives. Those mechanisms are typically the organisation's structures, decision processes and controls. The seminal study of Miles and Snow (1978) suggests an organisation moves through an adaptive cycle where management has to respond to major problems facing the organisation; the choice of product-market domain, technology and appropriate controls and structures. Firms must therefore solve the entrepreneurial, engineering and administrative problems respectively. The Miles and Snow (1978) framework suggests organisations have three viable alternative approaches or business strategies to move through the adaptive cycle and respond to the changing world.

The different business strategies firms pursue can be reduced to a limited number of generic strategies, and several frameworks have been suggested (Langfield-Smith, 1997; Miles and Snow, 1978; Miller and Friesen, 1982; Porter, 1980). The Miles and Snow (1978) typology includes three generic viable business strategies firms follow: defenders, prospectors and analysers. Defenders strive for efficiency and cost control to secure a stable portion of the market, while prospectors try to locate and exploit new product and market opportunities with diverse operations. Analysers sit between defenders and prospectors in seeking opportunities while maintaining efficiency. Their typology also includes a fourth type, the reactor, which is an unstable and inconsistent organisation that improperly pursues a viable strategy or otherwise fails to adapt to the changing environment. The strategy leads such an organisation to record poor performance. Since its publication, the Miles and Snow (1978) typology has been widely applied to analysing organisations and their business strategies. The number of studies applying it has continuously increased (Anwar *et al.*, 2021). The original typology of four generic business strategies has been widely used in research, although there has been suggestions of more finely divided generic strategy types (Anwar and Hasnu, 2016a; Chandra Balodi, 2014). Doty *et al.* (1993) introduced the idea of the four business strategies as ideal types and how an organisation's configurational fit with these ideal types affects overall organisational performance. Since then, this stream of research has received significant interest (Abernethy *et al.*, 2019; Gumusluoglu and Acur, 2016; Sollocy *et al.*, 2019; Thomas and Ramaswamy, 1996).

When organisations respond to the administrative problem within the adaptive cycle, appropriate controls and structures are implemented. Management controls (MC) are the processes and practices managers use to influence the behaviour of individuals and groups towards the pre-set objectives and goals of the organisation (Flamholtz *et al.*, 1985). These controls can include personal supervision, performance measurement and reward systems. These control processes and practices are not used in isolation, but are combined and used as a management control system (MCS) (Ferreira and Otley, 2009; Malmi and Brown, 2008). The contingency theory or approach is based on the idea that there is no single universally applicable solution to the problems of accounting or control (Otley, 1980, 2016) and prior contingency-based research suggests that different business strategies will perform better with a certain type of MCS (Chenhall, 2003). Management selects the appropriate combination of these controls to fit the firm's contextual conditions to reach its objectives and goals. In this dissertation, contingency theory is applied as a configuration form of fit to determine the goodness of this fit. A configuration form of fit assumes that there are only a few states of fit between context and structure, that is business strategies and MCS types (Gerdin and Greve, 2004, 2008).

The upper echelons theory (Hambrick and Mason, 1984) has been used extensively to investigate the influence of top management on firm performance. The upper echelons theory suggests top executives form personal

interpretations of the strategic challenges they face, and act based on them. These personal constructs are a function of the executives' prior experiences, values and personalities (Hambrick, 2007). The upper echelons theory also suggests that the properties of the top management team (TMT) as a group explain the firm's performance better than the properties of its individual members. The TMT is the organisation tier or echelon ultimately responsible for the strategic success of the firm or organisation and studies have linked TMT properties with the organisation's operational or strategic decision-making and the results that follow (Bromiley and Rau, 2016; Carpenter *et al.*, 2004; Certo *et al.*, 2006; Hambrick, 2007). Researchers have recently directed more attention to the relationship between the MCS and business strategy (Gani and Jermias, 2012; Gond *et al.*, 2012; Kober *et al.*, 2007), but also to how the properties of the top management influence the design and use of the MCS or the management accounting system (MAS) to implement or change the business strategy (Hiebl, 2014; Naranjo-Gil and Hartmann, 2006, 2007). Hence, the properties of the TMT affect the choice of business strategy and type of MCS to implement it.

Strategic management and management control research have recognised that management has strategic choice, which enables it to position the organisation and products in desirable environments and product-market domains (Chenhall, 2003; Hambrick *et al.*, 2005). The top managers are central to understanding how organisations determine their business strategies and how they are implemented. In other words, understanding the biases and character of an organisation's TMT can help understand why organisations do certain things (Hambrick, 2007). Since its publication, the Miles and Snow (1978) framework has been extensively used to analyse the effect of a business strategy on firm performance (Anwar and Hasnu, 2016b; Blackmore and Nesbitt, 2013; Parnell and Wright, 1993; Shortell and Zajac, 1990; Zahra and Pearce, 1990). It has also been applied to test the effects of managerial properties on the choice of business strategy and performance (Gupta and Govindarajan, 1984; Thomas *et al.*, 1991; Thomas and Ramaswamy, 1996). This dissertation applies the Miles and Snow (1978) business strategy framework and upper echelons theory (Hambrick and Mason, 1984) to examine the relationship between TMT properties, business strategy and organisation-level MCS type. The goodness of this relationships is reflected in organisational performance, which is measured as the firm's return on assets (ROA), a widely used objective organisational performance measure (Richard *et al.*, 2009).

1.2 Purpose of the thesis

There is considerable literature proposing various frameworks for MCSs (e.g., Bedford and Malmi, 2015; Ferreira and Otley, 2009; Malmi and Brown, 2008; Merchant and Van der Stede, 2012; Simons, 1995). Much of the MCS research focuses on the inner structure and interdependencies of the individual control practices within an MCS framework (Bedford and Malmi, 2015; Chenhall and

Moers, 2015; Davila *et al.*, 2015). Conceptualisations of overall MCSs are notably absent from the literature (Otley, 2016). Taking a broader view of the organisation and how it exercises control overall, and not at the level of individual control practices or mechanisms, allows the overall characterisation and categorisation of entire MCSs (Speklé, 2001). These MCS archetypes are specific and separate configurations of the control practices and systems in place and represent distinct groups of differing control types (Speklé, 2001). Although typologies of management control and MCS types have been suggested (Ouchi, 1979; Speklé, 2001; Whitley, 1999), there is still little empirical research on firm or organisation-level MCS types (Otley, 2016; Strauß and Zecher, 2013).

Berry *et al.* (2009) note the scarcity of research on how real control systems operate in practice, including the association of the configuration of the MCS with firm performance. Management selects the combination of controls deemed appropriate for the firm's context, objectives and business strategy. The success of these choices is reflected in firm performance. Some MCS combinations may be better than others and identifying the MCS types supports better choices. In addition, research work has increasingly examined the relationship between a business strategy and MCS, but the results are still fragmented and often conflicting owing to inconsistent conceptualisations and operationalisations (Berry *et al.*, 2009; Langfield-Smith, 1997; Otley, 2016; Tucker *et al.*, 2009).

The cognitive properties of the TMT, the intended business strategy and the features of the MCS form the overall strategic management control system of the organisation, and the relationships between the parts of this system and their effects on performance are under review. In summary, there is a gap in our knowledge of how TMTs affect firm performance through the choice of business strategy and the MCS used to implement it. There is also a need for empirical research on organisation-level MCS types to clarify the business strategy and MCS fit.

This dissertation investigates the effect of the TMT properties, business strategy and organisation-level MCS type on firm performance. The TMT is expected to generate a business strategy for the organisation and implement it with an MCS. The properties of the TMT are expected to affect the choice of business strategy and the type of MCS used to implement it to achieve the desired goals. The current study seeks to answer the following research question: *How is firm performance linked with the TMT properties, business strategy, and organisation-level MCS type?* The relationship between the different parts is shown in Fig. 1 as an overall strategic control system where the fit between the different parts is reflected in the performance.

The following sub-questions help to answer the main question through the three articles included in this dissertation:
- How are TMT demographic properties associated with firm performance? Article 1 examines the TMT − business strategy fit (Fig. 1)

by examining how TMT demographic properties are reflected in firm performance and how the team task affects this link.

- Are organisation-level MCS types identifiable? Article 2 explores the TMT − MCS fit (Fig. 1) by identifying organisation-level MCS types and how they are linked with the TMT properties.
- How does business strategy and MCS alignment affect firm performance? Article 3 examines the business strategy − MCS type fit (Fig. 1) and how it affects firm performance.
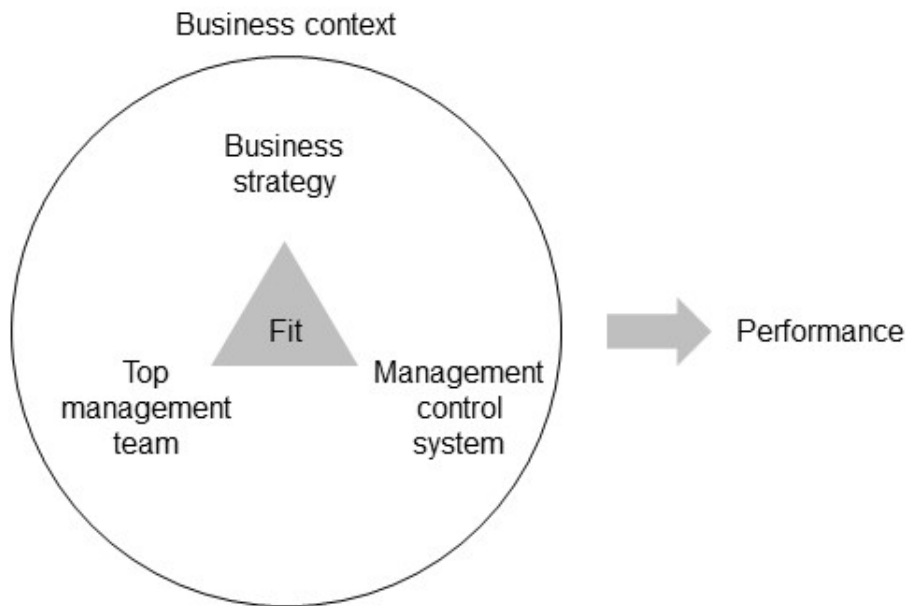
FIGURE 1   Central concepts analysed in the study – fit between the TMT, business strategy and MCS influences performance of the organisation

This dissertation makes several contributions to the business strategy and management control literatures. First, this dissertation contributes to the upper echelons and TMT literature (Carpenter et al., 2004; Hambrick and Mason, 1984; Homberg and Bui, 2013) by suggesting the effects of TMT demographic properties on firm performance vary depending on the TMT's task and how firm performance is measured. The TMT's task is linked with the firm's business strategy, which is reflected in the performance measures. The results suggest demographic properties of the TMT that foster convergence are linked to firm performance through asset turnover (ATO), while properties that foster divergence are linked through profit margin (PM). High ATO reflects a cost-leadership business strategy, while high PM reflects a differentiation business strategy.

How an organisation tackles the basic task of organising and controlling is an underlying property of the organisation. This enables the overall characterisation and categorisation of whole MCSs as distinct archetypes or groups of control types with different configurations of control procedures and systems. This dissertation contributes to the MCS literature (Otley, 2016; Ouchi, 1979; Speklé, 2001) by proposing a theory-based measurement construct to identify and group organisation-level MCS types. Using measures reflecting the firm size, TMT functional backgrounds and TMT tenures, four different organisation-level MCS types were identified: clan, adhocracy, market and hierarchy MCS types.

This dissertation also contributes to the business strategy and MCS literature (Chenhall, 2003; Langfield-Smith, 1997; Otley, 2016) by suggesting the choice of business strategy and overall organisation-level MCS type affect firm performance. When pursuing a defender strategy, the firms applying the market or hierarchy forms of MCS outperformed firms applying the clan or adhocracy forms. In contrast, a firm pursuing a prospector strategy would benefit significantly more from using a clan or adhocracy type MCS than would a firm using a market or hierarchy MCS. The findings suggest firms implementing an analyser business strategy and operating in two product-market domains could apply the management controls and techniques of both domains separately, thus attenuating their individual impacts on performance. This suggests the fit between business strategy and organisation-level MCS type is reflected in firm performance. Together, the TMT, business strategy and MCS form the overall strategic management control system of the organisation and the fit between the three factors affects performance.

Taken together, the results suggest that the TMT's demographic properties are reflected in firm performance. The effect can be positive or negative depending on the TMT's task, which reflects the organisation's business strategy. The results also imply the demographic properties of the TMT reflect the organisation and control types that make it possible to identify organisation-level MCS archetypes. Finally, the organisation-level MCS archetypes represent different types of management controls applied in the organisation and the results suggest that aligning the organisation's business strategy with the MCS type improves performance.

1.3   Structure of the thesis

This dissertation consists of two parts. The first part provides an overview of the research conducted. First, the topic of the research is outlined and presented in Section 1. Section 2 presents the theoretical background of the dissertation. This section includes a discussion of business strategy and MCS research, upper echelons theory and its use in management accounting research, and how MCS types have been studied. The research approach is outlined in Section 3, including a discussion of the methodological choices and a review of the

collection and analysis of the data. Section 4 summarises the results and contributions of the three articles included in this dissertation. The first part ends with a summary of the theoretical contributions, managerial implications and limitations of this dissertation, and also suggestions for possible future research opportunities.

The second part comprises the three articles included in this dissertation. The author was the sole author of the first article, "Top management team demography and firm operating performance: A path analysis", and the third article, "Does business strategy and management control system fit determine performance?" The second article, "Exploring management control system typologies: an organisation-level view", was co-authored with Professor Jukka Pellinen, who was involved in formulating the research question and contributions. The author was the leading co-author and collected and analysed the data.

2 LITERATURE REVIEW

This section discusses the theoretical background of this dissertation. Although this dissertation contributes to the management accounting and management control literature, other theoretical approaches are also applied and discussed here. First, business strategies and their fit with management control are discussed. Next, the upper echelons literature on TMT composition and performance and how it has been used in management accounting research is discussed. Finally, the literature on organisation-level MCS types is presented and discussed.

2.1 Strategy and management control

2.1.1 Contingency theory in MCS research

Contingency theory has been extensively used in management accounting and MCS research since the mid-1970s (Chenhall, 2003; Otley, 1980, 2016). Structural contingency frameworks originated in the organisation theory research during the 1960s from the pivotal work of Burns and Stalker (1961), Woodward (1965), and Lawrence and Lorsch (1967) when investigating the effect of environment and technology on organisation structure (Chenhall, 2003). The contingency theory or approach is based on the idea that there is no single universally applicable solution to the problems of accounting or control (Otley, 1980, 2016). Instead, it proposes that the characteristics of the organisation's accounting or control system are dependent on the organisation and its situation. Otley (1980, p. 413) noted "a contingency theory must identify specific aspects of an accounting system which are associated with certain defined circumstances and demonstrate an appropriate matching." Therefore, attention must be paid to the features of the MCS that are to be explained, the circumstances or context of the organisation and how matching or fit is defined and measured (Chenhall, 2003; Otley, 2016).

During the 1980s and 1990s, much of the research focused on arbitrarily chosen single features of the MCS and a limited set of contingent variables (Otley, 2016). Although Otley (1980) introduced the idea that the separate management information systems and controls used within the organisation form a package and should be investigated collectively, research has focused on single features of an MCS. Malmi and Brown (2008) revived the idea of an MCS being a package and defined it as a collection of individual controls or control systems intended to steer the behaviours and decisions of the employees towards the organisation's objectives and strategies. They also provide a typology of the MCS package that consists of five types of controls: planning, cybernetic, reward and compensation, administrative, and cultural controls. Ferreira and Otley (2009) suggested an MCS framework in which controls in place form a system of interconnected controls and this framework can be used to study and plan the structure and operation of control systems. To clarify the discussion, Grabner and Moers (2013) suggested the controls form a system if the control practices are and were designed to be interdependent, while all controls and systems in place are a package. This view, that control packages are not separate from control systems but may contain individual controls and various interconnected sub-systems has gained support within MCS research (Bedford, 2020; Merchant and Otley, 2020). Despite these developments, Otley (2016) summarised that the extant research on MCSs was incoherent as the variables analysed in each study do not correspond to the variables analysed in previous work. He also noted that this preoccupation with details of the MCS has led to limited attention being paid to characterising the MCS itself as a whole.

Although the suggested MCS frameworks enable the study of whole MCSs in their totality, extant research has focused on identifying and studying distinct elements of the MCS without considering the other elements or controls surrounding it and their possible interdependencies (Merchant and Otley, 2020; Otley, 2016; Strauß and Zecher, 2013). In turn, viewing the organisation in its entirety and how control is dealt with permits the categorisation and characterisation of whole MCSs (Speklé, 2001). Although several typologies of whole MCSs have been published (e.g., Ouchi, 1979; Speklé, 2001; Whitley, 1999), there is little research on organisation-level MCS types in the existing literature on management control (Otley, 2016). The extant typologies suggest three to five different MCS types, but many of the different types share common properties, and this dissertation suggests they can be merged into four different MCS types: clan, adhocracy, market and hierarchy control (Jukka, 2023; Jukka and Pellinen, 2020). Clan control is characterised as empowering, result-oriented, teamwork and human resource development, while adhocracy control is characterised by agility, growth and innovation. Market control emphasises goal orientation and readiness to change. Hierarchy control is depicted by large organisation size, effective use of assets and high productivity. These MCS types allow the research of whole control systems and how they relate to the organisation's context.

Initially, the contingency variables regarding the organisations' environment, technology, organisational structure or size used in MCS research were borrowed from organisation theorists (Langfield-Smith, 1997; Otley, 2016). Subsequent research confirmed these key variables as the fundamental and generic variables describing context and added contemporary aspects of environment, technology and organisational structure to the multitude of contingencies explaining the effectiveness of MCS (Chenhall, 2003). In a review of the management accounting and control research applying a contingency perspective, Otley (2016) summarises technology, market competition, environmental uncertainty and national culture as the most often used external variables. The same study lists organisational size, structure, strategy, compensation practices, information systems, psychological variables, employees' participation in the control systems, market position, product life cycle stage, and systems change as the most used internal variables.

2.1.2 Business strategies

While there are various definitions for strategy, it has often been defined as a unified, comprehensive, and integrated plan of action and patterns in a stream of actions and decisions that guide the organisation toward predefined goals and objectives (Mintzberg, 1996). The realised strategy is frequently described as the deliberate strategy of plans and actions flowing from an intended strategy. In reality, emergent strategies often rise from market, technological and political disruptions and are assimilated into the final realised strategy. As Mintzberg (1996) notes, most realised strategies are on a continuum between intended and emergent strategies.

Although plans and actions concerning the organisation and its tasks are made on many levels in the organisation, three different levels of strategy can be identified (Johnson *et al.*, 2009). Corporate strategy is concerned with the overall purpose and scope of the organisation and deals with selecting which businesses to operate in, the acquisition and divestment of businesses, and the financing and structuring of the organisation (Johnson *et al.*, 2009; Langfield-Smith, 1997). The second level − business or competitive strategies − relates to how the organisation's different business units compete and position themselves in their particular markets (Langfield-Smith, 1997). The third level − operational strategies − deals with how the component parts or different functions of the organisation contribute to the organisation's corporate and business strategies (Johnson *et al.*, 2009).

The management literature has provided several business strategy typologies that analyse and classify business strategies to explain how firms compete in their respective environments (Higgins *et al.*, 2015). Miles and Snow (1978) classify business strategies into three viable strategies (defender, analyser and prospector) and an unstable failed strategy (reactor). The three viable strategies form a continuum with defenders and prospectors at the opposing ends and analysers between them. Defenders are defined as firms with narrow product-market domains and are focused on efficiency and competitive pricing.

At the other end, prospectors attend to a broad and developing domain and continuously search for new opportunities. Analysers combine defender and prospector characteristics and operate in the two product-market domains balancing the often conflicting domains. The reactor is an unstable and inconsistent organisation that fails to adapt to the changing environment and is often considered unviable (Conant *et al.*, 1990). Reactors often change their behaviour at different points in time and may display defender, analyser or prospector characteristics. Consequently, reactors are often difficult to identify, and the type is often omitted from studies (Blackmore and Nesbitt, 2013).

Porter (1980) introduced three generic strategies that provide sustainable competitive advantage within an industry: overall cost leadership, product differentiation and focus. The overall cost leadership concentrates on efficiencies and aggressive cost controls aiming to be the lowest-cost producer in the industry. The differentiation strategy seeks to differentiate the firm's products or services to create something that is perceived industrywide as unique and highly valued by its customers. The focus strategy seeks to service the needs of a particular buyer group or market segment extremely well. The three generic strategies are viable alternative strategies, and failing to adopt one of them equates to not having a coherent and consistent strategic orientation, or being stuck in the middle which results in poor performance or failure (Parnell, 2010; Porter, 1980).

Treacy and Wiersema (1993) also suggest three viable business strategies: operational excellence, product leadership and customer intimacy. Firms pursuing an operational excellence strategy focus on making operations lean and efficient to lead the industry in price and convenience. A product leadership strategy in turn seeks to continually produce new and innovative products and services, while a customer intimacy strategy focuses on the specific needs of particular customers. The framework also suggests that firms focus on one of these value disciplines and meet industry standards in the other two to gain exceptional competitive advantage.

Although the labels of the business strategies differ between the typologies, the strategies share common features and identify firms operating at opposing ends of the strategy continuum (Bentley *et al.*, 2013). Porter's (1980) cost leadership and differentiation strategies and Treacy and Wiersema's (1993) operational excellence and product leadership strategies align with Miles and Snow's (1978) defender and prospector strategies, respectively. Following these commonalities, inferences based on the Miles and Snow (1978) typology are likely to align with inferences based on the other typologies (Bentley *et al.*, 2013). The three viable strategies of the Miles and Snow (1978) typology form a continuum allowing strategy operationalisation with a measure from archival data (Bentley *et al.*, 2013; Higgins *et al.*, 2015; Ittner *et al.*, 1997). Unlike the other typologies, the Miles and Snow (1978) framework also includes a failed strategy, the reactor. Due to their uncertain nature and inconsistent behaviour, reactors are often excluded from studies, and only viable strategies are identified and studied (Blackmore and Nesbitt, 2013). Not identifying the reactors and

categorising them within the viable firms can distort the strategy-performance link, as reactors are considered unviable or unprofitable (Hambrick, 1983; Miles and Snow, 1978).

2.1.3 Contingency fit

Although prior contingency-based research has explored the MCS as both an independent and a dependent variable, an MCS is often defined as an independent variable, and its fit with context is expressed as a measure of desired organisational or managerial performance (Chenhall, 2003; Otley, 2016). Good fit results in improved performance, while poor fit leads to reduced performance. The most commonly used performance measure in such studies is financial performance because most organisations use it (Otley, 2016).

Different forms of contingency fit have also been comprehensively discussed in management accounting contingency research (Burkert *et al.*, 2014; Gerdin and Greve, 2004, 2008). First, a distinction can be made between congruence fit and contingency fit (Gerdin and Greve, 2004, 2008). Congruence fit indicates firms have fully adapted their MCS to the requirements of their context, and only the best-performing firms survive and can be observed (Burkert *et al.*, 2014; Gerdin and Greve, 2004). Contingency fit assumes firms can have varying levels of fit, and deviations from the optimal MCS and context fit undermine firm performance (Gerdin and Greve, 2004, 2008).

Contingency fit can be further separated into cartesian fit and configuration fit. Cartesian fit between structure and context is seen as a continuum where the organisation can make small, frequent changes. In contrast, configuration fit maintains there are only a few states of fit between structure and context, meaning that organisations must make major leaps from one state to the other (Gerdin and Greve, 2004, 2008).

The continuous cartesian fit can be further separated into matching, moderation, or mediation forms of fit. In the matching form of fit, the relationship between the MCS variable and performance is an inverted U-shape, and there is only one optimal MCS for each contingency variable level. There are also multiple combinations of the MCS variable and contingency variable that can deliver the same level of performance (Burkert *et al.*, 2014; Gerdin and Greve, 2008). In contrast, with the moderating form of fit, the relationship between the MCS variable and performance is linear and varies according to the contingency variable which acts as a moderator variable (Burkert *et al.*, 2014; Gerdin and Greve, 2004). Finally, the mediation form fit implies an intervening mechanism between the independent and dependent variables, or in other words, the independent variable affects an endogenous variable which in turn affects the dependent variable (Burkert *et al.*, 2014; Gerdin and Greve, 2004).

2.1.4 The MCS and business strategy research

Contingency theory has also been used in researching the relationship between MCS and business strategy. In her review, Langfield-Smith (1997) concluded

that knowledge of the relationship between MCSs and business strategy remained limited despite most MCS-strategy research focusing on business strategy rather than corporate or operational strategies. Although different parts of an MCS (e.g., cost control orientation, reward systems, interactive or diagnostic controls) have been studied, the picture remains fragmented. In addition, the different business strategy typologies and variables used to operationalise strategy add to the confusion.

Chenhall (2003) reviewed contingency research on MCSs and concluded that defender or cost-leadership oriented strategies reflect a formal MCS emphasising cost control, detailed operation goals and budgets with strict budget controls. In contrast, differentiation or competitor-focused strategies are associated with a broad-scope MCS used for planning, subjective long-term controls, and the interactive use of budgets.

Although contingency research on the relationship between the MCS and business strategy has attracted some research interest since Langfield-Smith's (1997) review (e.g., Gani and Jermias, 2012; Kober *et al.*, 2007; Tucker *et al.*, 2009), Otley (2016) notes the findings are still fragmented and lacking cumulative contributions. He suggests this results from the use of simple generic strategy typologies and varied dimensions of the MCS without any fixed structure or content. Although the research is extensive, the variability in the chosen MCS features and business strategy has made it difficult to develop a coherent body of knowledge on the relationship between MCS and business strategy.

In this study, the Miles and Snow (1978) typology was chosen to classify and analyse the business strategies. The typology has been widely used, contains the main strategy types (including a failed type) and facilitates comparing results with previous management accounting contingency studies.

2.1.5 Organisational performance

Organisational performance and its measurement are essential for researchers throughout many areas of management research. How the organisation succeeds in competing for customers, inputs and capital make organisation performance central to the survival and success of a firm (Singh et al., 2016). Measuring organisational performance is necessary in enabling researchers and managers to assess the value and effect of certain actions of firms and managers, compare firms with their competitors and how firms change and perform over time. Although organisational performance is widely used in strategic management, economics, finance and accounting, it is not the only possible measure of organisational effectiveness. Organisational effectiveness is a broader construct than organisational performance and includes various internal outcomes related to more efficient or effective operations, but also external measures that are not directly linked with economic value, such as reputation, survival, and corporate social responsibility (Hult et al., 2008). Organisational performance is thus more specific, and Richard et al. (2009) divide it into three areas of firm outcomes: financial performance (e.g., profits, return on assets, return on in-

vestment), product market performance (e.g., sales, market share) and shareholder return (e.g., total shareholder return, economic value added).

According to Richard *et al.* (2009), there are three common approaches to organisational performance measurement, that is, a single measure, multiple measures or an aggregated measure. A single measure is used when it is presumed that this measure is related to performance either based on theory and evidence or often merely assumed. Multiple measures or dependent variables can be used to give a more comprehensive view of performance. Although, when using multiple measures they should not all be from the same areas of outcomes, e.g., financial performance measures (Hult et al., 2008). Lastly, several dependent variables can be aggregated into a single measure of organisational performance. This is most common with subjective measures of performance.

Specific measures can be classified as objective, subjective and quasi-objective measures (Richard *et al.*, 2009). Objective accounting measures (e.g., ROA, ROI) are the most common and readily available measures of organisational performance. Their use is supported by ample evidence showing that accounting and economic returns are related. Financial market measures (mostly shareholder return) are often used in strategy, economics and finance research. They are often perceived as forward looking, while accounting measures are seen as backward looking (Dutta and Reichelstein, 2005). Mixed accounting/financial measures (e.g., Z-score, Tobin's q) balance risk (overlooked in accounting measures) with operational performance (missing from market measures). Survival of an organisation, an objective performance measure, is often used in management studies. In contrast, subjective measures ask supposedly well-informed informants about organisational performance allowing to tailor the measure and address the desired performance constructs directly. Quasi-objective measures draw objective performance information through self-report techniques (asking sales growth from a sales manager). Surveys, self-reports and Lickert scales are typical subjective and quasi-objective measures. Although objective measures are often seen as more robust than subjective measures as informants may overstate their organisations performance, Singh et al. (2016) noted that subjective measures can be considered valid and reliable measures of performance especially in multinational settings and emerging markets.

Return on assets (ROA) was chosen as the performance measure of the organisations. It is readily available from the published and audited accounting data and can be considered objective. ROA is also popular in management studies and can be applied to different types of organisations and allows comparison of different industries (Kihn, 2010). This is important as the sample contains different size organisations from multiple industries.

2.2 Top management team and performance

2.2.1 Upper echelons theory

Upper echelons theory (Hambrick and Mason, 1984) has been broadly used to investigate the effect of the top executives and their decisions on the behaviour and performance of organisations (Bromiley and Rau, 2016; Certo *et al.*, 2006; Nielsen, 2010). To understand why organisations do certain things, we need to concentrate on the most influential actors within them and their biases and character (Hambrick, 2007). Upper echelons theory suggests that top executives form personal interpretations of the strategic challenges they face and act based on those interpretations. These personal constructs result from the executives' prior experiences, values and personalities (Hambrick, 2007; Hambrick and Mason, 1984). The TMT, comprising the top executives, is the organisational tier or echelon responsible for the choice of strategy and the success of the organisation. Accordingly, TMT composition is associated with the organisation's operational or strategic decision-making and the consequent results (Carpenter *et al.*, 2004; Hambrick, 2007; Naranjo-Gil *et al.*, 2008).

Organisational demography theory proposes that an organisation, an organisational group, or a team can be examined as a single unit using the demographic properties of its members (Lawrence, 1997). Moreover, collecting and aggregating data on individual group members means it is possible to form one measure that reflects the behaviour of the group as one unit (Hambrick, 2007; Lawrence, 1997). In addition, organisational demography theory suggests the use of directly observable and measurable demographic properties of the research subjects results in more objective, accurate, predictive and parsimonious explanations (Wiersema and Bantel, 1992). Applying this theory overcomes the limits and difficulties of measuring the attitudes, cognitions and values of the group members, which are notably difficult to measure especially within the busy top management. Similarly, upper echelons theory suggests, that the demographic properties of the TMT combined as a group explain the organisation's performance better than the properties of its individual members (Hambrick, 2007). Leading a large organisation is a collective effort and draws on the combined knowledge, capabilities and interactions of all executives involved. The upper echelons literature has mostly centred on the effects of group diversity within the TMT; however, group or organisational performance could be more closely linked with the level of the group demographic property instead of its diversity, for example, mean age compared to age standard deviance (Bell *et al.*, 2011).

Upper echelons theory suggests that the demographic properties of top executives can serve as proxies for their cognitive settings (Hambrick, 2007). If that is indeed the case, it should be possible to predict strategic actions from the executives' ages, business or firm tenures, educational backgrounds, functional backgrounds, and other affiliations. Since its introduction by Hambrick and Mason (1984), upper echelons theory has been refined and complemented.

Hambrick (2007) added managerial discretion and executive job demands as possible moderators for the effect of demographic properties on organisational outcomes, as they affect executives' freedom to make choices. The division of power should also be considered as some executives wield more power than others. In addition, behavioural integration or more team-like behaviour within the TMT should be considered. The structural interdependence of the TMT has also been suggested as a possible moderator between demographic properties and organisation performance (Hambrick *et al.*, 2015).

2.2.2   Top management team

The TMT comprises the organisation's senior executives and can be understood as a dominant coalition (Carpenter *et al.*, 2004). The TMT members provide an interface between the organisation and its environment, are powerful, and their decisions and actions affect the organisation. An essential element of TMT research is defining the TMT and its members. Much of the predominantly U.S.-based upper echelons literature does not present the TMT as a real team, meaning the TMT construct and its members are identified by position in the hierarchy or by job title (Glunk *et al.*, 2001). Certo *et al.* (2006) conducted a meta-analysis that presents several TMT definitions in which the TMT consisted of a varying number of organisation tiers or echelons of board directors and top executives. The TMT has also been defined as the top executives who are not on the board of directors (Boeker, 1997; Naranjo-Gil and Hartmann, 2006; Smith *et al.*, 2006). Instead of the researcher defining the TMT, the TMT can be identified as the executive team announced by the firm in their annual reports (Nielsen and Nielsen, 2013). In addition, the terms top management team and upper echelons have been used interchangeably in the extant literature (Yamak *et al.*, 2014).

    The TMT of a firm can be seen as a group, a team or something in between. Senior and Swailes (2004) define a group as an unrestricted number of people interacting with each other, who are aware of each other and see themselves as a group. A team is a social group whose members see themselves as a team and is also seen by outsiders as a team. Team members are also committed to mutual goals and methods and see themselves responsible for those (Senior and Swailes, 2004). In contrast, Boone and Hendricks (2009) noted that the perception of TMTs as teams that meet regularly to discuss issues and exchanging ideas, while being dedicated to problem-solving can be misleading. Although a TMT might not be a real team, Boone and Hendricks point out that to utilise its members' functional expertise, the TMT must co-operate and function more like a team. Hambrick (2007) also observes that TMTs seldom work as real teams, but they can integrate their behaviour and thus work more like teams. Given the team-like behaviour, the TMT can be defined as a team of top executives declared by the firm. This definition also aligns with the team concept of a social group which sees itself as a team and is seen by outsiders as a team (Senior and Swailes, 2004).

2.2.3 TMT demographics and performance

Research on the effects of team member demographic properties on team performance has centred on how differences or diversity in the demographic properties affect team or firm performance (Bell *et al.*, 2011). Team or group diversity can positively or negatively impact performance depending on how diversity is conceptualised. Work-group diversity and performance research comprises two main perspectives (Williams and O'Reilly, 1998). The social categorisation perspective maintains that similarities and differences are used as a basis to categorise the self and others into groups, resulting in intergroup disputes. Therefore homogenous groups should perform better than diverse groups (van Knippenberg *et al.*, 2004; Williams and O'Reilly, 1998). In contrast, the information/decision-making perspective suggests a diverse group has a broader range of task-relevant information resulting in more creative decisions, and diverse groups should perform better (van Knippenberg *et al.*, 2004; Williams and O'Reilly, 1998).

van Knippenberg *et al.* (2004) proposed a categorisation/elaboration model of work group diversity and group performance that was based on the information/decision-making perspective. The model suggests that diversity influences group performance in two ways: Diversity induces the elaboration of information, thus improving group performance. At the same time, social categorisation can cause biases that disrupt this link, thus impairing group performance. Accordingly, diversity in a group or team results in different types of knowledge, decision-making models and a wider range of perspectives, that is, the elaboration of task-relevant information and perspectives. Accordingly, group performance should considerably improve in group creativity, innovation and decision quality. In van Knippenberg *et al.'s* model, differences between group members or diversity can also bring about social categorisation, that is, the differentiation between the similar to self in-group and the dissimilar to self out-group. Social categorisation can give rise to more positive responses to the in-group than the out-group; in other words, it can foster intergroup biases. The negative impacts of diversity on group performance are then caused by the intergroup biases interfering and disrupting the group diversity-elaboration link (van Knippenberg *et al.*, 2004).

The diversity of the demographic variable has been the focus of the majority of research on the team member demographic property and team performance link, while mostly ignoring other representations of the team-level demographic variable, such as, mean age instead of age diversity (Bell *et al.*, 2011). While evidence indicates a link between diversity and team performance, the effects are frequently difficult to detect and insignificant (Bell *et al.*, 2011; Homberg and Bui, 2013). Nevertheless, there is evidence that the elevated level of a team demographic variable, such as mean age, has a greater effect on team performance than diversity (Bell *et al.*, 2011; Gonzalez-Mulé *et al.*, 2020). In addition, omitting the level variable from the model used to test the relationship between diversity and performance could cause the effect of diversity to be confounded with the effect of level (Harrison and Klein, 2007).

Consequently, the level of team demographic properties may be a more significant predictor of team performance than diversity in these variables.

2.2.4 Upper echelons theory in management accounting research

Neely *et al.* (2020) assert that though upper echelons theory (Hambrick and Mason, 1984) has become one of the most influential perspectives in management research, it has attracted only modest interest in management accounting research. Several studies have examined how top management utilises accounting information. The composition of a TMT has been found to affect how top management utilises the management information system (MIS) to improve strategic performance in cost reduction and flexibility (Naranjo-Gil, 2009). Knardal and Bjørnenak (2020) found festival managers with a business education use budgets for planning and coordination in particular. These studies suggest the composition of the TMT and manager's properties affect how accounting information is used within the organisation.

Upper echelons theory has also been used to research how the properties of top management affect the use of an MAS. TMTs with members primarily from professional and administrative backgrounds use an MAS differently which affects strategy implementation (Naranjo-Gil and Hartmann, 2006). In a second study, Naranjo-Gil and Hartmann (2007) suggest when TMT diversity is measured as a composite measure of age, tenure, education and experience diversity, it affects strategic change through the design and use of the MAS. Focusing on a single member of the TMT, the role of the chief financial officer (CFO) in the adoption of MAS innovations (such as ABC and BSC) has also been investigated (Naranjo-Gil *et al.*, 2009).

The top management attributes have additionally been linked with the design and use of the MCS. The demographic properties of the chief executive officer (CEO), mainly age and education, have been associated with the design of the evaluation system (Reheul and Jorissen, 2014). The TMT's information technology knowledge and knowledge creation process have been suggested to promote its support for the use of MCS innovations (Lee *et al.*, 2014). TMT properties have also been linked with the design of the MCS. The leadership of and the diversity within the TMT play a key role in the MCS change processes when they interact with intra-organisational dynamics and external contexts (Morelli and Lecci, 2014). On an individual level, younger and shorter-tenured CFOs and CEOs have been associated with more innovative and elaborate management accounting and control systems (Hiebl, 2014). More interactive use of an MCS and more non-financial performance measures have been linked with older, female and longer-tenured university deans (Bobe and Kober, 2020). This stream of research suggests the properties of the TMT, or its individual members, can be associated with how the MCS is designed, developed and used within the organisation.

The upper echelons theory has also been used to examine the use of strategic management accounting (SMA) techniques. Pavlatos and Kostakis (2018) found that among CEOs, CFOs and chief marketing officers (CMOs)

shorter tenure, business education background and creativity increase the adoption and use of SMA tools (e.g., attribute costing, value analysis and strategic pricing). The education level of the CEO has also been linked with the application of SMA techniques and firm performance (Kalkhouran *et al.*, 2017).

Although the use of upper echelons theory in management accounting research has been modest, the above review suggests its use in the last decade has increased substantially. Despite this, the research is fragmented, and each study investigates a narrow area of management accounting. Only half of the reviewed studies examined the effects of the properties of the TMT, while the other half focused on single members of the TMT. The large proportion of studies focusing on single members is odd as one of the main ideas of upper echelons theory is that the properties of the whole TMT offer a stronger explanation of the organisation's outcomes than the attributes of any single member (Hambrick, 2007). A common feature of the studies was their utilising surveys to collect data instead of archival data and hardly using demographic properties of the managers as proxies. Another of the key ideas of upper echelons theory is use the observable demographic properties of the TMT as proxies of their cognitive frames and to collect data from databases (Hambrick, 2007; Hambrick and Mason, 1984). In this study the TMT as a team is the object of inquiry and archival data on its demographic properties and performance are used.

2.3 Management control

2.3.1 Management control system types

Although the MCS research has mainly focused on individual management controls within the MCS frameworks, the extant MCS literature has also identified a number of MCS typologies rooted in a cybernetic, transaction cost economics (TCE) or the comparative sociology approach (Strauß and Zecher, 2013). Strauß and Zecher (2013) found the early cybernetic-based MCS typologies focused on the differences in control mechanisms and processes making the TCE-based (Lebas and Weigenstein, 1986; Ouchi, 1979; Speklé, 2001) and comparative sociology based (Whitley, 1999) typologies more suitable for defining and characterising a whole MCS.

Ouchi (1979) suggested classifying an MCS based on how the organisation executes evaluation and control through market, bureaucracy or clan control mechanisms. External market mechanisms (e.g., prices and transactions) are utilised in market-type control to regulate behaviour. The bureaucracy-type control applies externally set rules and output controls to influence behaviour. Ouchi's third control type, clan-type control, applies rituals, internalised beliefs and values to guide behaviour. The three MCS types suggested by Lebas and Weigenstein (1986) are essentially the same with different names; the market, rules and culture approaches.

Whitley (1999) applied the comparative sociology approach to propose an MCS typology with four different control types. His output-based, bureaucratic and patriarchal control systems align with Ouchi's (1979) market, bureaucracy and clan types and Lebas and Weigenstein's (1986) market, rules and culture types. The additional fourth MCS type, delegated control systems, grants control to autonomous groups or units within the organisation.

Speklé (2001) adopted the TCE approach and suggested an MCS typology with five control types. The four control types in the earlier typologies have similar counterparts in his typology. The market and bureaucracy control types in the previous typologies match his market and machine controls. Speklé's (2001) boundary control closely resembles the clan, culture, or patriarchal types in the earlier typologies in its use of interdicts and setting limits to control behaviour. Speklé's fourth type, exploratory control, centres on interaction and formulating insights to establish cooperation. This type closely resembles to the delegated control type suggested by Whitley (1999). Speklé suggests a fifth control type, arm's length control, which merges parts of the more extreme competitive market and administrative machine control types into a hybrid control type. The arm's length control does not have a counterpart in the earlier typologies.

2.3.2   The competing values framework

The competing values framework (CVF) suggested by Quinn and Rohrbaugh (1983) has been extensively used to analyse and categorise organisations (Büschgens *et al.*, 2013; Hartnell *et al.*, 2011; O'Neill and Quinn, 1993). The three-dimensional framework is formed of value dimensions (control-flexibility, internal-external, and means-ends) that are behind conceptualisations of organisational effectiveness and performance evaluation. Organisational structure is reflected in the first dimension, with values ranging from control and stability to flexibility and individuality. The second dimension represents organisational focus ranging from an internal focus emphasising internal capabilities, integration and the well-being and development of the individuals in the organisation to an external focus stressing differentiation, competition and the organisation itself. These two main dimensions form quadrants representing the four types of organisations in the CVF: clan, adhocracy, market and hierarchy. The third dimension differentiates whether the organisation focuses on means or important processes rather than the ends or results within the four quadrants. The CVF suggests that the basic assumptions, values and structures associated with the organisation type are reflected in differing organisational effectiveness measures. Organisations apply the appropriate management controls to attain those distinct goals and objectives (Cooper and Quinn, 1993; Hartnell *et al.*, 2011).

The internally oriented and flexible organisation quadrant characterised as a human relations model is labelled a clan type (Cameron and Quinn, 2006; Quinn and Rohrbaugh, 1983). The emphasis is on cohesion, human resources and training, and the organisation is a cohesive clan or team (O'Neill and Quinn,

1993). Leadership is compassionate and expected to demonstrate concern and support in building trust and commitment between employees (Hartnell *et al.*, 2011; O'Neill and Quinn, 1993). Participation, communication and empowerment are used as means to achieve people development and employee commitment as ends (Hartnell *et al.*, 2011).

The second quadrant encompassing flexible organisations, but with an external view of the organisation, is characterised as an open systems model and labelled an adhocracy type (Cameron and Quinn, 2006; Quinn and Rohrbaugh, 1983). These organisations are depicted as organic, flat, loosely coupled, matrix or temporary, and as valuing growth, encouragement, diversity, autonomy and attention to detail (Hartnell *et al.*, 2011; O'Neill and Quinn, 1993). Adhocracies encourage adaptability, agility and creativity as means to produce innovation, growth and resource acquisition as ends (Hartnell *et al.*, 2011; Quinn and Rohrbaugh, 1983).

Similarly externally oriented, but exerting control through harsh control structures and mechanisms in the third quadrant is the rational goal model also labelled as market type (Cameron and Quinn, 2006; Hartnell *et al.*, 2011). Market type organisations assume clear goals and potential rewards motivate employees to perform with determination and meet expectations (Hartnell *et al.*, 2011). Planning and goal setting are used as means to achieve productivity and efficiency (Quinn and Rohrbaugh, 1983).

The last quadrant, the internal process model or hierarchy type, is characterised by rigid control mechanisms and structures combined with an internal focus on the individuals. These organisations are often hierarchies, and their basic notion is that employees meet expectations when their roles and tasks are clearly defined (Hartnell *et al.*, 2011; O'Neill and Quinn, 1993). Hierarchies produce control, stability and predictability by means of using information management, process control and measurement (Hartnell *et al.*, 2011; Quinn and Rohrbaugh, 1983).

2.3.3 Four types of control and top management properties

The extant management control literature identifies MCS typologies that characterise overall MCS types (Speklé, 2001; Strauß and Zecher, 2013). Although the MCS typologies suggest three to five different MCS types, they can be merged with the four contrasting organisation models in the CVF. The CVF clan, market and hierarchy organisation types align directly with the MCS types (Büschgens *et al.*, 2013; Yu and Wu, 2009). Ouchi's (1979) clan, market and bureaucracy; Lebas and Weigenstein's (1986) culture, market and rules; Whitley's (1999) patriarchal, output-based and bureaucratic; and Speklé's (2001) boundary, market and machine control types have direct counterparts in the CVF clan, market and hierarchy organisation types. Whitley's (1999) delegated control and Speklé's (2001) exploratory controls align with the adhocracy organisation type in the CVF. Article 2 (Jukka and Pellinen, 2020) of this dissertation includes a broader discussion of how the different MCS typologies align with the CVF.

The CVF applies organisation effectiveness and performance measures to differentiate the four organisation types, and each type has distinctive effectiveness criteria and measures (Quinn and Rohrbaugh, 1983). Utilising the organisation properties and measures typical for each organisation type proposed in prior literature (e.g., Hartnell *et al.*, 2011; O'Neill and Quinn, 1993; Quinn and Rohrbaugh, 1983; Zammuto and O'Connor, 1992) makes it possible to differentiate and identify the organisation and control types. The four identified organisation types explain the differing behaviours that take place within these organisation types (Quinn and Rohrbaugh, 1983).

The organisation's TMT consists of its most powerful actors, and upper echelons theory suggests their demographic properties will reflect how they will act when making strategic decisions (Hambrick, 2007; Hambrick and Mason, 1984). Accordingly, the organisation type and control type are reflected in the demographic properties of the TMT. Previous research has established how top management influences the organisation's culture and values (Bhimani, 2003; Hu *et al.*, 2012), use the organisation's culture and values as control systems (Chatman and O'Reilly, 2016; Marginson, 2009), or align the control systems with the prevailing organisation culture (Heinicke *et al.*, 2016). Although an unlimited number of organisations and TMT constructs could be chosen to differentiate the control types, a limited number of uncorrelated constructs enables the identification of the types via a configuration analysis (Bedford and Malmi, 2015).

This study assumes that organisation-level MCSs can be identified. The extant management control literature has identified differing organisation-level MCS types that can be linked with the four organisation types in the CVF. These organisation-level control or organisation types emphasise distinct behaviours and controls, thus enabling their identification based on their distinct TMT and performance measures. The demographic properties of the TMT reflect how management will act when facing strategic decisions, while performance measures reveal what the organisation values.

3 RESEARCH APPROACH

3.1 Methodology

Social scientists examine their subjects through explicit or implicit assumptions about the nature of the social world and how it might be explored. Burrell and Morgan (1994) divide social theory into four broad paradigms based on theoretical assumptions about the nature of social science and the nature of society. The four paradigms, functionalist, interpretive, radical humanist and radical structuralist, represent mutually exclusive interpretations of the social world. The nature of social science means it makes assumptions about ontology, epistemology, human nature and methodology and distinguishes subjectivist and objectivist approaches in this dimension. The nature of society separates the sociology of regulation and the sociology of radical change.

This dissertation is rooted in the functionalist paradigm and assumes an objectivist approach to social science and a sociology of regulation approach to the nature of society. Its ontological assumption, or what is reality, is realism, where reality is objective in nature and not the product of the mind (nominalism) (Ahrens and Chapman, 2006). How knowledge can be understood, or its epistemological assumption, is that regularities and causal relationships explain the social world around us (positivism). That is in contrast to the relativistic view, where the social world is understood through individuals participating in the activities (anti-positivism) (Chua, 2019). Concerning human nature, this dissertation is more inclined to view individuals and their experiences as products of the environment (determinism) rather than viewing individuals as the creators of their environment (voluntarism) (Chua, 1986). The studies in this dissertation examine interactions and regularities between various elements using quantitative methods (the nomothetic approach) rather than trying to obtain first-hand data on the subjects (an ideographic approach). Burrell and Morgan (1994) characterise the

sociology of radical change as radical change, structural conflict and contradiction, so this dissertation aligns with the sociology of regulation depicted as status quo, social order and consensus. Within the functionalist paradigm, contingency theory is situated within the social systems theory and objectivism at the more objective end (Burrell and Morgan, 1994).

3.2 Data collection

Data for the three articles were collected from firms listed in the NASDAQ OMX Helsinki stock exchange. This sample was chosen as the Finnish Corporate Governance Code applied by the stock exchange demands operative management be distinct from the board of directors and that firms report the organisation of their management and the management team if it exists. Finnish firms readily disclose information about their management team and organisation.

The TMT was defined in all three articles as the group of top executives the firms reported as their TMT in their annual reports. This is in line with the definition of a real team where both the group itself and outsiders see it as a team (Senior and Swailes, 2004). This definition is applicable to different types and sizes of organisations because the firms decide the size and composition of their TMT based on their needs in managing their organisation.

The firms' published and audited annual reports provide reliable data on the TMTs. Those data were supplemented with information from firm stock exchange releases, firm internet pages and the LinkedIn profiles of TMT members. Financial data were collected from the Voitto+ firm information database published by Suomen Asiakastieto Oy and the firms' audited annual reports.

The data for Article 1 were collected from firms operating in the fields of basic materials, consumer goods, consumer services, industrial and technology industries during the period 2008−2011. Financial firms were omitted as their assets and liabilities differ considerably from the sample. Healthcare and utilities are regulated industries and were thus left out. The single state-owned firm in the oil and gas sector was excluded so as not to risk the generalisability of the results. The selection process resulted in 330 firm-years of data from 89 firms. The calculation of the Mahalanobis distances revealed ten possible outliers (Hair *et al.*, 2015), and after individual inspection, they were dropped from the sample, resulting in 320 firm-years of data. The ratio of 17.8 cases per estimated variable was acceptable for the structural equation modelling (Hair *et al.*, 2015; Schreiber *et al.*, 2006).

The data for Article 2 related to firms in the basic materials, consumer goods, consumer services, industrial, technology and telecommunication industries in the period 2008−2011. The one firm in the telecommunications industry resembles the firms in consumer goods and services justifying its inclusion. Like Article 1, the other industries were omitted. The selection

process resulted in 337 firm-years of data from 90 firms. Based on Euclidian distance, one firm was judged to be an outlier and removed (Hair *et al.*, 2015). Six more firms were removed due to missing data. The final sample comprised data on 83 firms with 318 firm-years.

The time period was extended to 2008–2015 for Article 3, resulting in 659 firm-years of data from 90 firms. Two firms were deemed outliers based on Euclidian distance and removed (Hair *et al.*, 2015). In addition, eight firms were removed due to missing data. The data available then related to 80 firms and 621 firm-years. After calculating the strategy construct and the four organisation-level MCS types, the sample included 80 firms with 391 firm-years of data.

3.3   Data analysis

Article 1 applied structural equation modelling (SEM) to test the hypothesised relationships between the measured TMT variables and firm performance variables. Unlike other multivariate techniques, SEM estimates multiple distinct but interdependent, regression equations simultaneously, which enables the estimation and testing of multiple dependencies simultaneously. Structural equation modelling is also suited to hypotheses testing since the goodness-of-fit of the theory-based structural model can be assessed from a number of fit indices, and the coefficients and their significances are estimated for the relationships or paths in the model (Hair *et al.*, 2015). A confirmatory modelling strategy was applied as the structural model to be tested was developed based on theory rather than comparing multiple alternative models. A covariance-based method of SEM in SPSS AMOS 26 software applying a maximum likelihood estimation was used to estimate the structural model and path coefficients since it is widely used and robust regarding violations of normality assumptions (Hair *et al.*, 2015).

Article 2 applied cluster analysis to group the sample into firms applying similar MCSs. Cluster analysis is the most common technique used to group similar individuals or objects into clusters that are similar to one another and dissimilar to the objects in the other clusters (Hair *et al.*, 2015; Ketchen and Shook, 1996; Short *et al.*, 2008). Cluster analysis can be divided into hierarchical and non-hierarchical methods. Hierarchical clustering methods often apply a distance similarity measure and a clustering algorithm to group together similar clusters as the process proceeds. The process starts with the individual objects, and each object or cluster is combined with the most similar object or cluster until all objects are in one cluster, thus producing n - 1 cluster solutions. Ketchen and Shook (1996) suggest using the agglomeration coefficient, the cubic clustering criterion or theory to determine the appropriate number of clusters in the solution and applying more than a single method is also recommended. Changes in the agglomeration coefficient and theory were used in Article 2 to determine the appropriate number of clusters. Ward's method was used with

the suggested squared Euclidian distance as similarity measure owing to its popularity and tendency to produce clusters of equal size (Hair *et al.*, 2015; Short *et al.*, 2008). Cluster analysis and Ward's method in particular are sensitive to outliers, which were removed accordingly (Hair *et al.*, 2015). The variables were also standardised as Z-scores to avoid variables with large ranges having more weight in determining the cluster solution (Ketchen and Shook, 1996).

Unlike hierarchical clustering methods, non-hierarchical clustering methods assign objects to a predetermined number of clusters with a possibility to reassign objects to other clusters to maximise homogeneity within clusters and maximise heterogeneity between clusters (Hair *et al.*, 2015). The initial cluster centres or seed points are assigned by the researcher or automatically by the software. The software then assigns each object to the cluster with the most similar cluster centre with the possibility to reassign objects to another cluster when optimising the cluster solution. In Article 2, the hierarchical cluster solution was further optimised using non-hierarchical K-means clustering (see Hair *et al.*, 2015; Ketchen and Shook, 1996). The initial cluster centres may affect the final cluster solution. The robustness and validity of the cluster solution can be tested by determining how many objects are correctly grouped when varying the initial cluster centres. Hair *et al.* (2015) suggest a cluster solution is stable or very stable when at least 80% or 90%, respectively, of the objects are correctly grouped. The criterion or predictive validity of the cluster solution can be further evaluated with variables excluded from the clustering, but which theoretically differ between the clusters (Hair *et al.*, 2015). Analysis of variance (ANOVA) and a post-hoc multiple comparison procedure was used to examine the differences in the variable means between the clusters (Hair *et al.*, 2015; Howell, 2008).

In addition to the cluster analysis above, Article 3 identified the business strategy of the firms. Snow and Hambrick (1980) conclude there are four approaches to identifying and measuring business strategies: investigator inference, self-typing, external assessment and objective indicators. When applying investigator inference, the researcher uses all available data to assess the firm's business strategy. This approach is suited for a small sample or case study and identifies the realised rather than the intended strategy (Snow and Hambrick, 1980). Self-typing is a popular approach to identifying business strategies and allows the firm's top executives to identify the strategy (Anwar and Hasnu, 2016a; Conant *et al.*, 1990). Self-typing often relies on a survey with multiple-item scales or a single paragraph describing the different strategies allowing large samples (Conant *et al.*, 1990). Often self-typing identifies the intended rather than the realised strategy (Snow and Hambrick, 1980). An external assessment method utilises outside experts (e.g., competitors, consultants and industry analysts) to identify strategies. As each firm is assessed individually, this method suites small samples and identifies the realised rather than the intended strategy (Snow and Hambrick, 1980). The objective indicators approach has become a popular way to identify business

strategy (Anwar and Hasnu, 2016a; Conant *et al.*, 1990). Multiple variables representing or proxying different aspects of business strategy are used to identify it (Conant *et al.*, 1990; Snow and Hambrick, 1980). Large samples of archival data can be analysed using scoring, ranking or clustering methods to identify realised strategies (Anwar and Hasnu, 2016a; Conant *et al.*, 1990; Snow and Hambrick, 1980).

Objective indicators and a ranking method were applied in Article 3 to measure and identify the four strategies in the Miles and Snow (1978) typology. In line with prior research by Bentley *et al.* (2013) and Ittner *et al.* (1997), a composite strategy measure was constructed to reflect different aspects of the underlying business strategy using (1) the ratio of research and development to sales, (2) the growth of sales, (3) the ratio of employees to sales, (4) the ratio of sales to operating costs, (5) the variation in the number of employees, and (6) the ratio of net property, plant, and equipment (NPPE) to total assets (an inverted scale). Prospectors were expected to score higher than defenders. A four-year rolling average was calculated for each of the six measures, and the firms were ranked in quintiles within each industry. Firms in the highest quintile received a score of 5, and those in the lowest quintile scored of 1. The scores were summed across the measures. Firms with scores between 6 and 13 were considered defenders, those scoring between 14 and 22 were considered analysers and those scoring between 23 and 30 were considered prospectors.

Prior research has tended to focus on the three viable strategies and omitted the reactor strategy (Blackmore and Nesbitt, 2013). A reactor strategy is deemed unviable and unprofitable (Hambrick, 1983; Miles and Snow, 1978), resulting in poor performance that is reflected in a low or negative ROA. Accordingly, in Article 3, reactors were identified as firms with two negative ROA values during a three-year period and were labelled as reactors before the viable strategies were identified. A single negative ROA value was deemed a random variation, and the firm was retained as a viable strategy case.

Article 3 tests whether a certain business strategy performs better with a particular type of MCS. Business strategy was operationalised using the Miles and Snow (1978) typology, and three viable strategies (defender, analyser and prospector) were identified. The fourth unviable or failed business strategy (reactor) was also identified in the sample and included in the analysis. Instead of conceptualising fit as congruence fit where only the best-performing organisations survive, using the contingency approach to fit permitted the organisations to have varying degrees of fit. Better fit indicated better performance. Although the viable business strategies were measured on a continuum allowing a cartesian approach to fit, the sample was split into three separate viable strategies based on the strategy measure. This approach created a configuration approach to fit where only a few states of fit exist between context and structure. In addition, the unviable strategy and the four distinct MCS types included in the analysis meant a configuration approach to fit because the sample was split into subgroups whose performance was then compared. The outcome suggests the business strategies would be associated

with different MCS types applying differing control techniques and practices. This way of testing contingency fit would imply a configuration approach with symmetrical interactions (Gerdin and Greve, 2008). In this case, symmetrical interactions mean a business strategy performs strongly with a certain MCS type while a different business strategy performs strongly with another type (Gerdin and Greve, 2008).

Gerdin and Greve (2004) also describe a mediating form of fit, where the independent variable affects an endogenous variable, in turn affecting performance. Studies using the mediating form of fit have been criticised for both not really testing for mediation effects and their models lacking a fit between structure and context, a key concept of contingency theory (Burkert *et al.*, 2014; Gerdin and Greve, 2008). Although using path analysis in Article 1 did not directly address the contingency theory of management accounting, the usage did test whether different top management demographic properties are linked with performance through disaggregated measures representing different TMT tasks and business strategies. A similar path analysis could illustrate how the different business strategies (contexts) affect or mediate the links between different parts of the MCS and performance.

All three articles used publicly available audited accounting data on firm performance and the demographic properties of the TMTs to examine the association of TMT demographic properties with firm performance, to identify and group organisation-level MCS types, and to explore the effect of business strategy and MCS type alignment on firm performance. In addition, the current research identified firm and TMT demographic variables that can be used to identify and group organisation-level MCS types.

4 SUMMARY OF THE ARTICLES

4.1 Top management team demography and firm operating performance: a path analysis

Article 1 examines the relationship between TMT demographic properties and firm performance. Prior upper echelons research has focused on the effects of TMT diversity on different aspects of firm behaviour or performance (Homberg and Bui, 2013; Nielsen, 2010). On the other hand, research on teams suggests the level of a demographic variable could have more effect on team performance than its diversity (Bell *et al.*, 2011; Gonzalez-Mulé *et al.*, 2020). Article 1 applied SEM to examine the effects of both level and diversity of TMT age, firm tenure and team tenure on firm performance. Firm performance was measured as return on net operating assets (RNOA) to focus on operating performance, and it was further disaggregated into profit margin (PM) and asset turnover (ATO). Higher PM is associated with differentiation strategies (Selling and Stickney, 1989; Soliman, 2008) that would benefit from diversity and different perspectives (Bell *et al.*, 2011). In contrast, higher ATO is associated with cost-leadership strategies (Selling and Stickney, 1989; Soliman, 2008) that focus on efficiency and convergence (Bell *et al.*, 2011).

The analysis showed that increasing age and age diversity of the TMT had a negative effect on both PM and ATO, although only the paths through ATO were significant. Poor performance due to increasing age results from deterioration of cognitive skills, while social categorisation was linked with poor performance with congruence-seeking TMTs. Increasing firm tenure did not affect PM but had a significant positive effect on ATO, implying that long tenures integrate organisation members and benefit convergence-seeking cost-leadership TMTs. Increasing firm tenure diversity improved PM (albeit not significantly) while impairing ATO. van Knippenberg *et al.* (2004) devised a categorisation-elaboration model of work group diversity and group

performance. The model indicated that diversity triggers elaboration that benefits differentiation strategies, while social categorisation interferes with that link and thus harms cost-leadership strategies. As expected, increased team tenure among the TMT significantly increased both PM and ATO as the team integrated its behaviour. Increased TMT team tenure diversity improved PM and significantly decreased ATO. Again, differentiation strategies can exploit the different perspectives while congruence-seeking cost-leadership strategies suffer.

Article 1 contributes to the current understanding of upper echelons and TMTs. While prior research has shown a link between TMT diversity and firm performance, the findings in this research suggest the level of the demographic variable can have a stronger effect on performance. In addition, this effect can be in the opposite direction, the positive effects of increased team tenure can be overturned by the negative effects of increased team tenure diversity among the TMT. In addition, the results show the importance of using variables that measure the operating performance of TMT and the added detail brought by the disaggregation of these measures into separate paths. Finally, the results suggest diversity in the TMT can also have negative effects depending on whether the TMTs task requires divergence or convergence.

4.2 Exploring management control system typologies: an organisation-level view

Article 2 explores and identifies organisation-level MCS types. Prior MCS research has been based on the notion that an MCS is an assortment of individual management control practices addressing diverse control and management problems. Several MCS frameworks have been suggested where the practices and systems in use form a package (Malmi and Brown, 2008) or in which the management control practices form a system of interrelated controls (Ferreira and Otley, 2009). Consequently, much MCS research centres around the inner configuration and interdependencies of the control practices within the MCS. In contrast, how the organisation addresses the fundamental task of organising and controlling as a whole is a fundamental property of the organisation and allows the overall characterisation and categorisation of whole MCSs (Chatman and O'Reilly, 2016; Speklé, 2001). Management control system archetypes represent distinct groups of control types with different configurations of control practices and systems (Speklé, 2001).

Article 2 draws on the extant literature on MCS types (Lebas and Weigenstein, 1986; Ouchi, 1979; Speklé, 2001; Whitley, 1999) to identify four different organisation-level MCS types. Similarly, the CVF (Quinn and Rohrbaugh, 1983) consists of four different organisation types, each with distinct and characteristic organisational effectiveness measures. These organisation types align with the identified organisation-level MCS types and

allow them to be identified from organisational effectiveness measures. Upper echelons theory (Hambrick and Mason, 1984) holds that firms' strategic actions can be predicted from their TMT demographic properties, which also reflect the organisations' culture type and the management controls used to influence behaviour and achieve objectives. The CVF and upper echelons theory were used to derive organisation effectiveness and TMT constructs that differentiate firms and identify their organisation-level MCS types. Article 2 employs cluster analysis to differentiate the sample into four distinctive MCS types: clan, adhocracy, market and hierarchy.

Article 2 makes several contributions to the MCS literature. Although several organisation-level MCS typologies have been suggested in the extant literature (Lebas and Weigenstein, 1986; Ouchi, 1979; Speklé, 2001; Whitley, 1999), there has been little empirical research on them. Instead, MCS research has focused on the inner configuration and interdependencies of the controls within the MCS. Article 2 presents a theory-based measurement construct to identify and group organisation-level MCS types. In addition, these constructs are applied in grouping and identifying four distinct organisation-level MCS types that represent distinctive configurations of the control practices and systems in place. While prior MCS research has predominantly used survey questionnaires to collect data (Otley, 2016), Article 2 demonstrates the use of publicly available audited financial data that does not rely on the subjective assessment of managers surveys often use.

4.3 Does business strategy and management control system fit determine performance?

Article 3 explores the relationships between business strategy, MCS and firm performance. Strategic decisions are made on several levels in the organisation. While corporate strategy considers what businesses to operate in and how to finance and structure the organisation, business or competitive strategies are implemented at the organisation's business units and define how they intend to compete and position themselves in their respective markets (Langfield-Smith, 1997). Choosing to apply the Miles and Snow (1978) business strategy typology permitted the operationalisation of strategy as a continuous measure derived from archival data. An MCS is a collection of processes and mechanisms management uses to control and steer their organisation. Organisation-level MCS types can be identified based on how control is imposed in the organisations (Speklé, 2001). Article 3 uses the organisation-level MCS types identified in Article 2 (Jukka and Pellinen, 2020) to explore how the alignment of business strategy and MCS type affect firm performance.

Similarly to the findings of Article 2, the cluster analysis resulted in four groups representing different MCS types: clan (21.9%), adhocracy (25.4%), market (16.1%) and hierarchy (36.6%). The cluster solution was tested for

validity and robustness and was found to be very stable (Hair *et al.*, 2015). Analysis of the business strategies deemed 16.6% of the cases to be reactor strategy types, 11.0% to be defender, 62.1% to be analyser and 10.2% to be prospector type. The defender, analyser and prospector strategies proportions were comparable with earlier studies. The results showed that a defender strategy performs significantly better (higher ROA) with hierarchy or market MCS types than with clan or adhocracy MCS types. In contrast, the results revealed that a prospector strategy performs significantly better with clan or adhocracy MCS types than with hierarchy or market types. Analyser strategies perform well with all the MCS types. The results suggest certain business strategies perform better with a particular MCS type. Business strategy and MCS type should therefore be aligned.

Article 3 makes several contributions to the management control and strategy literature. The results suggest that a firm's business strategy and MCS type should be aligned to improve the likelihood of the firm attaining its goals and objectives. Prospector and defender strategies are more sensitive to the choice of MCS type. In contrast, the choice of MCS type is less critical for analysers who operate in two product-market domains. In addition, the results extend our knowledge of the administrative problem in Miles and Snow's (1978) adaptive cycle. The MCS types indicate how management attempts to solve the administrative problem, and the different MCS types may be better at solving either the entrepreneurial or the engineering problem. The research to date on the administrative problem has provided a limited perspective because it has explored individual constructs of the top management, organisation, structure, coordination or performance measurement (Conant *et al.*, 1990; Zahra and Pearce, 1990). Finally, the article demonstrates the use of archival accounting and TMT data as proxies for MCS archetypes and business strategies when examining the MCS−business strategy link. In contrast, prior research mostly relied on personal interviews and surveys of informants.

5   CONTRIBUTIONS AND CONCLUSIONS

5.1   Theoretical contributions

This dissertation has investigated the effects of the properties of the TMT, the business strategy and organisation-level MCS type on firm performance. The three articles included in this dissertation extend the knowledge of those effects by addressing sub-areas of the broader issue.

The relationship between top management demographic properties and performance has attracted considerable attention since the introduction of upper echelons theory (Hambrick and Mason, 1984). Although substantial evidence supports the notion that TMT demographic properties are reflected in firm performance (Carpenter *et al.*, 2004; Certo *et al.*, 2006; Hambrick, 2007), there is also evidence suggesting the absence of such a relationship (Homberg and Bui, 2013). This dissertation contributes to the upper echelons and TMT literature by suggesting the effects of TMT demographic properties on firm performance vary depending on the TMT's task and how firm performance is measured. The TMT's task is linked with the firm's business strategy, which is reflected in the performance measures. The results suggest demographic properties of the TMT that foster convergence are linked to firm performance through ATO, while properties that foster divergence are linked through PM. This result is in line with prior literature suggesting high ATO reflects a cost-leadership business strategy where congruence and efficiency are essential, while high PM reflects a differentiation business strategy where diversity and a wider range of perspectives are valued (Bell *et al.*, 2011; Selling and Stickney, 1989; Soliman, 2008). The results also suggest that depending on the TMT's task an increase in the level or diversity of the demographic property can also have a negative effect on performance.

This dissertation also sheds light on organisation-level MCS types. The extant literature suggests several organisation-level MCS typologies (Lebas and

Weigenstein, 1986; Ouchi, 1979; Speklé, 2001; Whitley, 1999). However, they have attracted little attention, and empirical MCS research has centred on the inner configuration and interdependencies of the controls within the MCS based on frameworks that depict the MCS as a collection of individual control practices and systems (Otley, 2016). Nevertheless, how an organisation tackles the basic task of organising and controlling is an underlying property of the organisation; one that enables the overall characterisation and categorisation of whole MCSs as distinct archetypes or groups of control types with different configurations of control procedures and systems (Chatman and O'Reilly, 2016; Speklé, 2001). This dissertation contributes to the MCS literature by proposing a theory-based measurement construct to identify and group organisation-level MCS types. Nine measures reflecting the firm size, TMT functional backgrounds and TMT tenures were used to group the sample into four clusters. Those clusters were designated based on the extant MCS typologies and CVF as clan, adhocracy, market and hierarchy MCS types. The suggested solution was consistent with prior research regarding the number of groups and their properties (Bedford and Malmi, 2015; Tsui *et al.*, 2006; Yu and Wu, 2009). In this light, the results of Articles 2 and 3 support the notion that organisation-level MCS types can be identified.

The relationship between business strategy, MCS and firm performance has been extensively researched in the management accounting and strategy literature, but the results remain ambiguous (Chenhall, 2003; Langfield-Smith, 1997; Otley, 2016). These indeterminate findings are, in part, a result of varying definitions and operationalisations of the business strategy and the MCS. The extant research on business strategy and MCS has largely relied on survey questionnaires and applied a collection of measures and variables that do not correspond with other studies, making comparisons difficult (Otley, 2016). In addition, self-typing by managers using multiple item scales or descriptive single paragraphs has been widely used to identify their organisation's business strategy (Anwar and Hasnu, 2016a; Conant *et al.*, 1990). This method often results in managers identifying the intended business strategy rather than the realised one. The method does not take into account how the firm's business strategy is positioned relative to competitors and the industry sector (Langfield-Smith, 1997; Snow and Hambrick, 1980). Nevertheless, business strategy can be identified from the firm's behaviour proxied by a limited number of relevant variables (Thomas *et al.*, 1991). The variables selected to operationalise the business strategy represent necessary resource allocations made by management to implement the selected strategy (Thomas *et al.*, 1991). In contrast to the self-typing methods, the method captures the realised rather than the intended business strategy (Thomas and Ramaswamy, 1996).

Much of the research on business strategy and MCS has focused on a single or a very limited number of varied management controls, which has constrained the formation of a consistent body of knowledge (Langfield-Smith, 1997; Otley, 2016). While the investigated controls originated in various MCS frameworks, they have been studied as isolated controls without interactions

with other parts of the MCS, thus prompting calls for the study of the overall package or system of controls and the conceptualisation of the overall MCS (Chenhall, 2003; Otley, 2016). In addition, identifying the individual management controls applied with survey methods can be problematic because their presence being reported does not mean they are actively used (Langfield-Smith, 1997).

Extant MCS research acknowledges management can choose the business strategy for the firm. Further, contingency-based research predicts certain types of MCSs will be better suited to applying particular strategies (Chenhall, 2003). However, this research area remains fragmented and lacks cumulative contributions (Otley, 2016). In response to those shortcomings, this dissertation contributes to the business strategy and MCS literature by investigating how the choice of business strategy and overall organisation-level MCS type affect firm performance. The results suggest the three viable business strategies in the Miles and Snow (1978) typology achieve substantially different performance and results when combined with different organisation-level MCS types. When pursuing a defender strategy, the firms applying the market or hierarchy forms of MCS outperformed firms applying the clan or adhocracy forms. In contrast, a firm pursuing a prospector strategy would benefit significantly more from using a clan or adhocracy type MCS than would a firm using a market or hierarchy MCS. These findings suggest a defender business strategy performs better when applying a control-oriented MCS type, while a prospector business strategy would benefit from a flexible MCS type. This result supports Chenhall's (2003) notion that conservative-oriented or stable business strategies, such as a defender and cost leadership types, would benefit from a centralised control system, formalised work and simple coordinating mechanisms. In contrast, entrepreneurial-oriented business strategies, such as prospector and product differentiation types, would benefit from decentralised control systems, flexible processes and complex coordination mechanisms. Similarly, Henri (2006) found management controls are applied differently at the opposing ends of the CVF flexibility-control dimension. Firms demonstrating a flexibility orientation applied more interactive controls and performance measures to increase interaction and communication, while firms with a control orientation applied fewer interactive controls and measures to enforce stricter control. The results of this dissertation also suggest that the performance of firms applying an analyser strategy is less dependent on the MCS type applied. Prior research suggests different management controls and techniques are applied when implementing the three viable business strategies (Chenhall and Langfield-Smith, 1998; Zahra and Pearce, 1990). The finding suggests firms implementing an analyser business strategy and operating in two product-market domains could apply the management controls and techniques of both domains separately, thus attenuating their individual impacts on performance.

The results of this dissertation also suggest the organisation's TMT, business strategy and MCS form an overall strategic management control system of the organisation, and the relationships between the parts of this

system are reflected in performance. Prior research has found that the demographic properties of the TMT are reflected in firm performance (Carpenter *et al.*, 2004; Hambrick, 2007), but the results of this dissertation suggest that this effect is dependent on the TMTs task, that is, the business strategy of the firm. Similarly, research has found that the composition of the TMT and properties of its members are reflected in the use of MASs to implement strategies and instigate strategic change (Naranjo-Gil and Hartmann, 2006, 2007) or in the design and use of the MCS (Hiebl, 2014; Lee *et al.*, 2014). This dissertation's findings show that the TMT's demographic properties signal the type of organisation-level MCS of the firm. Similarly, the relationship between business strategy and the various components of the MCS has attracted attention in extant research, but the results remain fragmented and do not make cumulative contributions (Otley, 2016). This dissertation indicates that the fit between business strategy and organisation-level MCS type is reflected in firm performance. Together, the TMT, business strategy and MCS form the overall strategic management control system of the organisation and the fit between the three factors affects performance.

This dissertation also contributes to the discussion on forms of contingency fit in management accounting research (Burkert *et al.*, 2014; Gerdin and Greve, 2004, 2008). Most management accounting research considers fit as a continuum and applies matching, moderating or mediating forms of fit (Burkert *et al.*, 2014). This dissertation applies a configuration form of fit where only a few archetypes of configurations exist, and organisations must choose between them. The four identified MCS archetypes form distinct configurations of controls, and organisations must make considerable jumps to move from one configuration to another rather than the small changes possible on a continuum. This dissertation also suggests a method to test the mediation form of fit of an organisation's business strategy. It does so by disaggregating the performance measure into measures that represent different business strategies. Disaggregating the ROA performance measure into PM associated with differentiation strategies and ATO associated with cost-leadership strategies facilitates testing for the mediation fit with path analysis. The method suggests it is possible to assess the fit between strategy and the MCS by examining the path coefficients and their significance.

As a whole, these results shed light on how TMT demographic properties are reflected in firm performance. The TMT's composition is reflected in the demographic properties of the TMT, which can positively or negatively affect firm performance. The effect depends on the TMT's task, be that pursuing a cost-leadership strategy valuing convergence or a differentiation strategy that values diversity. The TMT demographic properties also reflect the organisation and control type. That is because top management influence the organisation's culture and values and use them as control systems (Bhimani, 2003; Chatman and O'Reilly, 2016). Accordingly, the demographic properties of the TMT are reflected in the management controls of the firm and enable the identification of organisation-level MCS types. Finally, those organisation-level MCS types

represent different forms of management controls used in the organisation. The results of the current research suggest they are not all equally effective in implementing all business strategies. Organisations can therefore benefit from aligning MCS type with their chosen business strategy.

5.2   Managerial and practical implications

This dissertation also offers several managerial and practical implications. The results suggest that the effects of TMT age, firm tenure and team tenure depend on the TMT's task, that is, the organisation's business strategy. Increased firm tenure improves performance when pursuing a cost-leadership business strategy as the members' behaviours and perspectives become unified over time. TMTs pursuing either a cost-leadership or a differentiation business strategy improved performance with increasing team tenure as the TMTs integrated their behaviour and acted more like teams. However, it should be noted that increasing age and the following deterioration of cognitive skills among the TMT impair firm performance irrespective of business strategy.

Although the categorisation-elaboration model of work group diversity and group performance (van Knippenberg *et al.*, 2004) suggests diversity spurs elaboration of information and better performance, the results remind us that the effects of diversity are not always positive. Social categorising and intergroup-biases can disrupt the link. When pursuing a cost-leadership business strategy, intergroup-biases lead to negative performance with increasing age diversity, but when pursuing a differentiation business strategy, it merely cancels the positive effects of diversity. The results suggest increasing diversity in firm and team tenure positively affects performance when diversity is valued in differentiation business strategies. However, when convergence is sought in cost-leadership business strategies, diversity can impair performance.

The results also suggest that business strategy and the management controls used to implement it should be aligned. A defender or cost-leadership business strategy benefits from management controls that emphasise control, that is, market and hierarchy MCS types. In contrast, a prospector or differentiation business strategy benefits from management controls with a focus on flexibility, that is, clan and adhocracy MCS types.

An organisation's overall strategic management control system could enable the search for fit or misfit. That possibility might be useful when evaluating firms for investment or corporate governance purposes.

5.3   Limitations and future research opportunities

While this dissertation extends our knowledge on the effect of the properties of the TMT, the organisation-level MCS type and the business strategy on firm

performance, it does have limitations. Although considerable effort was made to collect a representative sample from multiple industries, it is a non-probability sample from a single country. While the Finnish business culture resembles other European business cultures, it is characterised by low power distance and high individualism (Hofstede, 2001). Cultures with low power distance are typified by equal rights, low hierarchies, and accessible leaders, while high individualism implies formal workplace relations and managing or controlling individuals. That environment might affect the internal relationships within the TMT and how the TMT works as a team. Accordingly, the sample might limit the generalisability of the results, and future studies should expand the research into other countries and business cultures.

Although cluster analysis is a suitable method to group objects with similar characteristics, it can be criticised for being too effective as it will always produce clusters even if there is no rational or theoretical basis for the result. Therefore, the cluster solution should be theoretically supported to bear any relevance. Unlike most other multivariate data analysis methods, cluster analysis has no mechanism to test the significance of the presented results. The number of clusters that best represent the data structure of the sample can be based on theory or a stopping rule, often an increase in a measure of heterogeneity (Hair *et al.*, 2015). When using hierarchical cluster analysis, the researcher must choose from a whole set of cluster solutions, while with non-hierarchical methods, the number of clusters must be pre-specified. The cluster solution could be validated applying cross-validation and establishing criterion validity to ensure its practical significance (Hair *et al.*, 2015). The stability of the cluster solution could be tested by cross tabulating the results of a split sample or the results from using different seed points and assessing the correspondence of the result. The criterion or predictive validity may be assessed from variables not used in the cluster analysis but known to vary between the clusters (Hair *et al.*, 2015). Although the cluster solutions in Articles 2 and 3 were valid and very stable, future research should verify that with other samples. In addition, the use of other multivariate data analysis to identify the MCS types could prove fruitful.

The applied business strategy measure also has limitations. The composite business strategy measure included measures representing resource allocations management deems necessary when implementing the business strategy. Although commonly used in strategy research, that measure is often only used to identify the three viable strategies or only the two extreme strategies defenders and prospectors, and the failed reactor strategy is omitted completely. Failure to distinguish the reactor strategies may confound the results, and earlier research has called for methods to identify them (Shortell and Zajac, 1990). This dissertation identified the reactors based on performance, but a more multidimensional approach might be more apt. In addition, identifying and labelling the business strategy might be problematic as the applied composite strategy measure, and ranking method identifies the realised strategy rather than the intended one (Thomas *et al.*, 1991). Also, management

might have a perspective on their business strategy that differs from the adopted business strategy typology (Langfield-Smith, 1997). Management might then be implementing a different business strategy from the one currently identified. Therefore, future research should investigate how management's intended business strategy aligns with the realised business strategy and how that affects the business strategy and MCS-type alignment.

A single accounting measure, ROA, was used as performance measure for the firms. Although ROA is suitable for comparing different types of firms from different industries, this profitability ratio could have been complemented with economic value measures and/or liquidity and solvency ratios to obtain a more comprehensive picture of the firms' performance (Kihn, 2010)

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ORIGINAL PAPERS

I

TOP MANAGEMENT TEAM DEMOGRAPHY AND FIRM OPERATING PERFORMANCE: A PATH ANALYSIS

by

Tapio Jukka, 2021

Top management team demography and firm operating performance: A path analysis

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Abstract

Purpose – This paper examined the relationship between TMT demographic properties and firm performance using both diversity and level variables and measuring differing constructs of firm performance representing divergent strategies.

Design/methodology/approach – Structural equation modelling was used to test the relationships between TMT demographic properties and firm performance measured as return on net operating assets (RNOA) and its disaggregates profit margin (PM) and asset turnover (ATO). Data was from 89 Finnish firms during years 2008–2011 resulting in 320 observations.

Findings – TMT team tenure had associations with RNOA through both PM and ATO while TMT age, age diversity, firm tenure, firm tenure diversity, and team tenure diversity showed paths through ATO. TMT firm tenure diversity showed effects in opposing directions through PM and ATO.

Practical implications – The results help to understand and apply the separate effects of age, firm tenure, and team tenure on TMT and firm performance. These results also provide explanations how these TMT properties affect firm performance in diverse types of firms pursuing different strategies.

Originality/value – The results suggest that both diversity and level in a measured TMT demographic property are linked with firm performance and the effect can be in differing directions. These links go through differing paths when using disaggregated operational firm performance measures. Also, diversity in top management is not always beneficial since it can cause separation or conflict impairing performance.

Keywords top management team, upper echelons, team properties, firm performance, operating performance, disaggregation, path analysis

Paper type Research paper

Top management team demography and firm operating performance:

A path analysis

1 Introduction

In order to understand why organisations do certain things, e.g., choice of strategy and the processes and mechanisms to implement it, we must focus on their most powerful actors (Hambrick, 2007). The top management team (TMT) is often seen as a dominant coalition of the most senior executives with authority and powers to guide the organisation towards success (Carpenter et al., 2004; Hambrick, 2007). The upper echelons theory (Hambrick and Mason, 1984) has been widely used to explore the effects of top management on firm performance. According to the upper echelons theory, the demographic characteristics of the top executives can be used as valid proxies of their cognitive states and the properties of the top executives can be aggregated as group properties and associated with the firm's strategic choices and performance.

Prior research has established the relationship between top management properties and firm performance (Carpenter et al., 2004; Certo et al., 2006; Hambrick, 2007). Much of the prior research has studied the relationship between the demographic properties of the top management and single firm performance measures (Certo et al., 2006), but the upper echelons theory has also been used to explore the relationship between top management properties and for example firm internationalisation, growth, strategic change, innovation, and management control (Hiebl, 2014; Kraiczy et al., 2015; Nielsen, 2010a). Although the effects of various top management properties have been researched, most studies have focused on TMT diversity and its positive effect on performance (Bromiley and Rau, 2016; Certo et al., 2006; Homberg and Bui, 2013). Diversity can also give rise to social categorising within a TMT, which can impair the positive effects of diversity or even cause a fall in performance (van Knippenberg et al., 2004). Literature on teams also suggest that performance could be more associated with the level of the team demographic property, e.g., team mean age, rather than its diversity (Bell et al., 2011).

TMT or organisation performance and business success have been often measured with return on assets (ROA) as it can be applied to different types of organisations and enables comparisons of varied industries (Kihn, 2010). Despite its popularity, ROA may be problematic as it pools operational and financing items (Nissim and Penman, 2001; Soliman, 2008). Burns et al. (2008) suggest that return on net operating assets (RNOA) is better suited to measure top management's operational performance. Since RNOA is calculated as the ratio of operating income to net operating assets, it focuses on operating performance and eliminates the effect of financing (Nissim

and Penman, 2001; Soliman, 2008). Using DuPont analysis to further disaggregate RNOA into profit margin (PM) and asset turnover (ATO) leads to better measures of the TMT effect on firm performance as PM and ATO are products of differing firm strategies. PM is frequently an outcome of differentiation strategies and ATO of cost leadership strategies (Selling and Stickney, 1989; Soliman, 2008). This allows the examination whether the TMT's group task, i.e., differentiation or cost leadership, affects the TMT properties-performance link and extends our knowledge on how TMT demographic properties affect performance.

Despite the growing body of upper echelons research, the results from previous research are still inconclusive and mixed (Hambrick et al., 2015; Homberg and Bui, 2013; Nielsen, 2010a). This research extends our knowledge of the relationship between TMT demographic properties and firm performance by examining the effect of TMT age, firm tenure, and team tenure average and diversity on firm performance. Applying structural equation modelling, the mediating effect of the TMT's group task, i.e., differentiation or cost leadership, is also evaluated. This research contributes to existing literature on TMTs and upper echelons in several ways. First, the results suggest that both diversity and level in a measured TMT demographic property are linked with firm performance and the effect can be in differing directions. Second, the results show the differing paths between TMT properties and firm performance when using disaggregated operational performance measures that measure differing constructs of a firm's operations. Third, the findings suggest that diversity in top management is not always beneficial and may cause separation and conflict impairing performance.

The paper proceeds as follows. Theoretical background for the upper echelons theory and TMT is provided in the next section. The third section describes the data and methods used while the results are presented in section 4. Finally, discussion with conclusions and limitations of the study are presented in section 5.

2   Theoretical background and hypotheses

2.1   *Upper echelons theory*

In order to understand why organisations do certain things we must focus on their most powerful actors with their biases and character (Hambrick, 2007). According to the upper echelons theory the top executives form personal interpretations of the strategic challenges they face, and act based on these interpretations. These personal constructs are a function of the executives' experiences, values, and personalities (Hambrick, 2007). The TMT is the organisation tier ultimately responsible for the success of the organisation and TMT properties have been linked with the organisation's

strategic or operational decision-making and the following results (Carpenter et al., 2004; Hambrick, 2007; Naranjo-Gil et al., 2008).

Pfeffer's organisational demography theory suggests that an organisational group can be studied as a unit through the properties of its members (Lawrence, 1997). It is possible to form one measure that reflects the behaviour of the group as one unit by collecting and combining data on the individual members. The upper echelons theory proposes that the properties of the TMT as a group explain the firm's performance better than the properties of its individual members (Hambrick, 2007). One person cannot manage and lead a large organisation alone. It is divided between the top executives thus making it a collective effort and drawing on the combined knowledge, capabilities, and interactions of everyone involved.

The upper echelons theory assumes that the executives' demographic properties can be used as proxies for their cognitive settings (Hambrick, 2007). This makes it possible to predict strategic actions from the executives' functional backgrounds, business or firm tenure, educational background, and other affiliations. The upper echelons literature has mostly focused on the effects of group diversity, but group performance could be more associated with the level of the group demographic property, e.g., mean age or tenure, than its diversity (Bell et al., 2011).

2.2   Top management team

The TMT can be seen as a dominant coalition consisting of the senior executives of an organisation (Carpenter et al., 2004). They provide an interface between the organisation and its environment, are powerful, and their decisions and actions influence the organisation. Central to the TMT research is defining the TMT and its members. In the dominant U.S. based upper echelons literature, the TMT construct and membership is often identified by position in the hierarchy or by job title, and the TMT is not seen as a real team (Glunk et al., 2001). In their meta-analysis Certo et al. (2006) identified various definitions for TMTs. The TMT consisted of a varying number of tiers or echelons of directors and top executives. Some studies have defined the TMT as the top executives not on the board of directors (Boeker, 1997; Naranjo-Gil and Hartmann, 2006; Smith et al., 2006). The TMT can also be defined as the executive team announced in the firm's annual reports (Nielsen and Nielsen, 2013). Adding to the confusion, the terms top management team and upper echelons have been used interchangeably (Yamak et al., 2014).

Although TMTs seldom work as real teams, they can integrate their behaviour and thus work more like teams (Hambrick, 2007). Boone and Hendricks (2009) also noted that the perception of TMTs as regularly meeting, discussing, exchanging ideas, and problem-solving teams can be misleading.

Although they point out that to utilise its member's functional know-how, the TMT must co-operate and function more like a team. In this light it is appropriate to define the TMT as a team of executives declared by the firm. This definition is in line with the team concept of a social group who see themselves as a team and is also seen by outsiders as a team (Senior and Swailes, 2004).

2.3 TMT demographics and performance

The effects of team member demographic properties on team performance has focused on how differences or diversity affect team performance (Bell et al., 2011). Team or group diversity has been assumed to have positive or negative effects on performance depending on how it is conceptualized. Building on the information/decision-making perspective, van Knippenberg et al. (2004) suggest a categorisation-elaboration model of work group diversity and group performance. In their model, diversity in a group or team leads to different types of knowledge, decision-making models, and a wider range of perspectives, i.e., elaboration of the task-relevant information and perspectives. This in turn leads to better group performance especially in group creativity, innovation, and decision quality. In their model, diversity or differences between group members can also induce social categorisation, i.e., differentiation between the similar to self in-group and dissimilar to self out-group. Social categorisation may cause more positive responses to the in-group than the out-group or intergroup biases. The negative effects of diversity on group performance are then caused by the intergroup biases interfering and disrupting the group diversity-elaboration link (van Knippenberg et al., 2004).

The majority of the research on the team member demographic properties and team performance link has focused on diversity of the demographic variable and largely ignored other representations of the team level demographic variable (Bell et al., 2011). Although there is evidence showing a link between diversity and team performance, the effects are often hard to detect and small (Bell et al., 2011; Homberg and Bui, 2013). There is also evidence suggesting that the elevated level of a team demographic variable, e.g., mean age, has a stronger effect on team performance than diversity (Bell et al., 2011; Gonzalez-Mulé et al., 2020). Thus, elevated levels of team demographic properties may be more important predictors of team performance than diversity in these variables.

The performance metric used may also affect the link between team demographic properties and team performance. In spite of its popularity, ROA imposes problems when measuring the TMT influence on firm performance as it pools operational and financing items (Nissim and Penman, 2001; Soliman, 2008). RNOA is calculated as the ratio of operating income to net operating assets thus focusing on operating performance and eliminating the effect of financing (Nissim and

Penman, 2001; Soliman, 2008) making it better suited to measuring the operational performance of the TMT (Burns et al., 2008). Using the Dupont analysis, RNOA can be disaggregated into the product of PM and ATO to better display the effect of the TMT (Fairfield and Yohn, 2001; Soliman, 2008). PM and ATO measure differing constructs of the firm's operations. PM is frequently an outcome of pricing power resulting from product innovation, product positioning, branding, first mover advantage, and market niches, often associated with differentiation strategies (Selling and Stickney, 1989; Soliman, 2008). Thus, TMTs pursuing innovation, creativity, and a wider range of perspectives would benefit from diversity and stress PM in performance measurement (Bell et al., 2011). On the other hand, ATO reflects asset utilisation and effectiveness following from effective use of fixed assets, efficient inventory processes, and working capital management, features of cost leadership strategies (Selling and Stickney, 1989; Soliman, 2008). When efficiency is the primary metric, TMTs would benefit from convergence and emphasise ATO (Bell et al., 2011).

2.4   TMT age

The TMT mean member age affects the team's performance because age can influence the way individuals behave and make decisions. Increasing age has long been linked with declining performance (Sturman, 2003). A simple explanation for the decline in performance is the deterioration of cognitive skills, e.g., learning, memory, and reasoning (Sturman, 2003). Ng and Feldman (2013) found that quick information processing, effective multitasking, and finishing tasks under pressure declined with increasing age. Although executives have been found to improve their management skills with age, but after the age of 45 increasing conservatism dwindles the positive effects (von den Driesch et al., 2015). Motivation can also be affected by increasing age as employees have been shown to lower their expectations and ambitions with increasing age (Sturman, 2003). Also, older executives start avoiding risks as financial and career security become more important, and oppose change as flexibility decreases and resistance increases (Wiersema and Bantel, 1992).

In sum, the decline in cognitive skills and lower motivation of older TMTs is expected to lead to lower firm performance with both differentiation and convergence type TMTs. The following hypotheses can be formed:

H1a: TMT age is negatively associated with firm PM.

H1b: TMT age is negatively associated with firm ATO.

Although diversity is expected to bring about a wider range of perspectives leading to better decisions and performance, increasing age diversity may result in decreasing TMT performance due to social categorisation leading to intergroup biases that impede the positive effects of age diversity. Physical properties like age are easily observed and more significant than other less visible demographic properties in the early stages of group development (Pelled, 1996). According to Wiersema and Bantel (1992), age helps to predict a person's non-work-related experience, and people of similar age share common experiences that lead to shared attitudes and beliefs. Individuals take this information into account when categorising other team members into groups within the TMT (Bell et al., 2011).

Diversity in TMT age may cause divisions in the TMT and increase personal conflict hindering firm performance especially with TMTs seeking convergence and stressing ATO over PM. This leads to the following hypotheses:

H2a: TMT age diversity is negatively associated with firm PM.

H2b: TMT age diversity is (strongly) negatively associated with firm ATO.

2.5   TMT firm tenure

A long tenure in the same organisation unifies its members' values and norms as the individual adopts the surrounding culture (Abebe, 2010). This socialisation generates common procedures for scanning the environment and processing information. A longer firm tenure also gives better knowledge and understanding of the organisation's norms and functions resulting in better performance of the team when efficiency is the measure (Bell et al., 2011). In addition, increasing firm tenure can also integrate the TMTs behaviour similar to the effect of team tenure by creating common perspectives and operating models (Hambrick, 2007). On the downside, long tenured executives tend to maintain the status quo by adhering to existing routines and resisting change leading to weaker performance if changes or new ideas are needed (Abebe, 2010; Boeker, 1997). This suggests long firm tenures could impair performance of the team when pursuing innovation, creativity, and a wider range of perspectives (Bell et al., 2011).

Thus, long tenure in the same organisation integrates and unifies the TMTs behaviour and decreases the top managements urge to change the status quo. This would impair the performance of firms with innovative and differentiation strategies but improve the performance of firms seeking effectiveness and cost leadership strategies. Hence, it can be hypothesised:

H3a: TMT firm tenure is negatively associated with firm PM.

H3b: TMT firm tenure is positively associated with firm ATO.

Persons that have served in the same organisation or task for extended periods develop common procedures for scanning the environment, processing information, and functioning within an organisation's culture (Sturman, 2003). In firm tenure diverse teams this organisational socialisation has taken place at different times and team members have greater variety of perspectives in terms of organisational know-how (Bell et al., 2011). Thus, increasing firm tenure diversity is a source for diverse and better decisions leading to improved firm performance (Hambrick et al., 1993; van Knippenberg et al., 2004). According to Bell et al. (2011), this diversity in perspectives would benefit innovative organisations seeking differing views. Increasing firm tenure diversity is also linked with poor firm performance when efficiency and routine tasks are emphasised. As van Knippenberg et al. (2004) pointed out, all types of diversity can elicit social categorisation resulting in intergroup biases that have a negative impact on performance. Thus, when teams seek effectiveness and convergence, diversity in perspectives can induce conflict and separation resulting in impaired performance (Bell et al., 2011).

Increasing firm tenure diversity brings in diverse perspectives improving the performance of firms with innovative and differentiation strategies. The increased diversity also inhibits convergence and unity in decision making of effectiveness-oriented firms. The following hypotheses can be drawn:

H4a: TMT firm tenure diversity is positively associated with firm PM.

H4b: TMT firm tenure diversity is negatively associated with firm ATO.

2.6   TMT team tenure

Increasing team tenure has notable effects for a team and its performance. Team tenure has been shown to have a positive effect on team performance and this link is mediated by team cognition (Gonzalez-Mulé et al., 2020). Team cognition refers to how important knowledge to team functioning is organised, represented, and distributed within the team, and allows team members to anticipate and execute actions (DeChurch and Mesmer-Magnus, 2010). Team cognition includes team mental models, i.e., knowledge that is held in common by team members, and the team's transactive memory system, i.e., knowledge of the information distribution within the team meaning who knows what (DeChurch and Mesmer-Magnus, 2010; Kozlowski and Ilgen, 2006). Team members have unique knowledge of the job, team, and organisation, and as team tenure increases,

more knowledge is accumulated and the team can draw from it to accomplish its task (Gonzalez-Mulé et al., 2020). Thus, teams with longer team tenure can develop effective team cognition with time and improve performance (Gonzalez-Mulé et al., 2020).

Although a TMT might not work as a team, but more often through bilateral relationships with the CEO, it can increase mutual interaction by integrating its behaviour (Hambrick, 2007). By integrating its behaviour, a TMT can develop effective team cognition with increasing team tenure like a real team and improve performance. While, both differentiation and cost leadership firms would benefit from the accumulation of knowledge, increased knowledge about who knows what could benefit more a differentiation strategy with diverse perspectives. This leads to the following hypotheses:

H5a: TMT team tenure is (strong) positively associated with firm PM.

H5b: TMT team tenure is positively associated with firm ATO.

Team tenure diversity implies that the team members have joined the team at different points of time and are at dissimilar stages of the social integration process. When new team members are integrated into the team, they bring fresh ideas, new perspectives, and challenge existing methods, while more tenured team members offer information on current structures and practices (Bell et al., 2011). According to van Knippenberg et al. (2004) this diversity brings about different types of knowledge and perspectives leading to better group performance especially in group creativity, innovation, and decision quality. These are valuable outcomes for TMTs and firms emphasising differentiation strategies. On the other hand, group or team tenure is both a highly visible and highly job-related demographic variable potentially causing social categorisation within the team and possibly leading to both affective and substantive conflict (van Knippenberg et al., 2004; Pelled, 1996). This could have an adverse effect on the link between diversity and increased knowledge or perspectives resulting in lower performance (van Knippenberg et al., 2004). This would negatively affect the performance of TMTs or firms seeking cost leadership strategies with congruence and effectiveness (Bell et al., 2011).

TMT team tenure diversity is expected to bring about diverse ideas and perspectives improving performance of innovative TMTs. The diversity in team tenure can cause social categorisation and conflict in congruence seeking TMTs weakening their performance. From this the following hypotheses can be formed:

H6a: TMT team tenure diversity is positively associated with firm PM.

H6b: TMT team tenure diversity is negatively associated with firm ATO.

Figure 1 illustrates the theoretical model and hypotheses.

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Figure 1 about here

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3   Data and Methods

3.1   Data

The sample was collected from the firms listed in the NASDAQ OMX Helsinki stock exchange during the years 2008–2011. The accounting information used to calculate firm performance was collected from the Voitto+ firm information database published by Suomen Asiakastieto Oy. The data was published in November 2012. This sample was chosen as Finnish companies readily publish information on their TMTs and the very interesting time period included both financial crisis and recovery. As U.S. samples dominate the upper echelons research (Homberg and Bui, 2013) this adds diversity to the research stream.

The TMT and its members were defined as what the firm reported. It was thus conceptualised as a real team identified by itself and outsiders. Information on the TMTs and their members was collected from the firms' audited annual reports. The information was supplemented with information from stock exchange releases, firm internet pages, and TMT member LinkedIn profiles. A six-month minimum tenure in a fiscal year was required to be counted as part of the TMT. It takes time to integrate a new team member and a leaving member may lack interest.

Data was collected from 89 firms in five industries (Table I). When data for a firm-year was missing, the firm-year was listwise deleted. This resulted in 330 firm-years of data. The Mahalanobis distance was used to detect outliers (Hair et al., 2015). Ten possible cases were found and after individual inspection all were dropped as deviant cases. The final sample consisted of 320 firm-years of data. This gave an acceptable ratio of 17.8 cases per estimated variable (Hair et al., 2015; Schreiber et al., 2006). The normality and linearity of the variate was checked visually and maximum VIF of 5.03 did not suggest multicollinearity (Hair et al., 2015).

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Table I about here

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3.2 Measures

Dependent variables

The dependent variables in this study were based on accounting figures, since management has more influence on accounting-based measures than on market-based measures (Shen and Cannella, 2002). RNOA was calculated as operating income before interest divided by average net operating assets (NOA), where NOA is operating assets less operating liabilities (Soliman, 2008). Operating assets were total assets less cash and short-term investments. Operating liabilities were total assets less short and long-term debt, less book value of total equity, and less minority interest. RNOA was disaggregated into PM $\times$ ATO, where PM was operating income before interest divided by total sales and ATO was total sales divided by average NOA.

Independent variables

Age and firm tenure were calculated as simple means for each team. Following Hambrick (2007), the TMT was assumed to work through bilateral relationships with the CEO, and TMT team tenure was operationalised as how long the TMT members have been on the TMT with the CEO. The lengths of all these dyadic relationships within the TMT were averaged to define the TMT team tenure. Age, firm tenure, and TMT team tenure diversity were conceptualised as separation and in line with Harrison and Klein (2007), standard deviation was used as a measure. Since the group size of the data varied possibly causing systematic bias in the results, a bias corrected formula for standard deviation was used (Biemann and Kearney, 2010).

Control variables

TMT size affects the decision making dynamics of the team (Carpenter et al., 2004; Kraiczy et al., 2015), while firm size, industry, and year can affect firm performance (Barkema and Shvyrkov, 2007; Camelo et al., 2010; Nielsen, 2010b). These were therefore added as control variables. TMT size was measured as total number of TMT members. The logarithm of total number of employees was used to measure firm size. Industry dummies were added to control possible industry effects. The 89 firms in the sample were grouped into five industries based on their ICB classification: (1)

basic materials, (2) consumer goods, (3) consumer services, (4) industrials, and (5) technology. Year dummies were added to control for temporal effects.

3.3   Analysis

Structural equation modelling (SEM) was applied using the SPSS AMOS 26 software to test the hypothesised relationships between the measured TMT properties and firm performance indicators. SEM can examine a series of relationships simultaneously and is useful in testing models containing multiple equations involving dependence and mediation relationships. The structural model and path coefficients were estimated using maximum likelihood estimation as it is widely used and robust against violations of the normality assumptions (Hair et al., 2015).

4   Results

Means, standard deviations, and correlations of the key variables are presented in Table II.

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Table II about here.

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Results of the structural equation modelling are presented in Table III. The hypothesised model received substantial support and displayed good fit to the data. The fit indices ($X^2 = 37.17$, df = 16, p = 0.002; CFI = 0.99; NFI = 0.98; RMSEA = 0.064; SRMR = 0.013) all showed acceptable goodness-of-fit (Hair et al., 2015; Schreiber et al., 2006). The proportions of variance explained by the model in PM, ATO, and RNOA were respectively 0.18, 0.25, and 0.77.

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Table III about here.

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Hypotheses 1a and 1b predicted a negative association between TMT age and firm PM and ATO, respectively. As shown in Table III, the standardised path coefficients were in the hypothesised direction and ATO was significant ($\beta = -0.09$; $\beta = -0.22$, p < 0.01). These results supported hypothesis 1b. Hypothesis 2a asserted a negative association between TMT age diversity and firm PM. Although the path coefficient from TMT age diversity to firm PM (Table III) was in the negative direction ($\beta = -0.03$), it was not significant, and hypothesis 2a was not supported. Similarly, hypothesis 2b predicted a strong negative association between TMT age diversity and

firm ATO. Table III shows that the path coefficient from TMT age diversity to firm ATO was in the asserted direction and strongly significant ($\beta = -0.20$, $p < 0.01$), thus supporting hypothesis 2b.

Hypothesis 3a predicted a negative association between TMT firm tenure and firm PM. Table III shows that the standardised path coefficient from TMT firm tenure to firm PM was in the predicted direction ($\beta = -0.01$) and statistically not significant. Thus, hypothesis 3a was not supported. As predicted in hypothesis 3b and shown in Table III, TMT firm tenure was positively associated with firm ATO ($\beta = 0.19$, $p < 0.05$). The path coefficient was statistically significant and hypothesis 3b was supported. Hypothesis 4a proposed a positive association between TMT firm tenure diversity and firm PM. Table III shows that the path coefficient from TMT firm tenure diversity was in the predicted direction ($\beta = 0.11$) but not significant. Therefore, hypothesis 4a was not supported. Hypothesis 4b predicted that TMT firm tenure diversity is negatively related to firm ATO. The standardised path coefficient between the variables (Table III) was in the predicted direction and statistically significant ($\beta = -0.15$, $p < 0.05$) supporting hypothesis 4b.

Hypotheses 5a and 5b predicted a positive association between TMT team tenure and firm PM and ATO. As Table III shows, both path coefficients from TMT team tenure to firm PM and ATO were in the predicted direction and statistically significant ($\beta = 0.16$, $p < 0.05$; $\beta = 0.17$, $p < 0.05$) lending support for hypotheses 5a and 5b. Hypotheses 6a asserted a positive relationship between TMT team tenure diversity and firm PM. The standardised path coefficient (Table III) from TMT team tenure diversity to firm PM was in the predicted direction ($\beta = 0.07$) but statistically not significant. Thus, hypothesis 6a lacked support. Hypothesis 6b asserted a negative relationship between TMT team tenure diversity and firm ATO. The standardised path coefficient (Table III) from TMT team tenure diversity to firm ATO was also negative and statistically significant ($\beta = -0.14$, $p < 0.10$) supporting hypothesis 6b.

In summary, these results suggest that the properties of the top management affect firm performance, but through different paths. While seven of the proposed twelve distinct hypotheses were supported, it should be noted that all six measured TMT properties had a significant effect on RNOA either through PM or ATO. TMT team tenure had significant associations with RNOA through both PM and ATO. TMT age, age diversity, firm tenure, firm tenure diversity, and team tenure diversity showed paths through ATO affecting RNOA. Interestingly, TMT firm tenure diversity showed effects in opposing directions when the path went through PM or ATO.

5 Discussion and Conclusions

This paper examined the relationship between TMT demographic properties and firm performance using both level and diversity demographic variables, and measuring differing constructs of firm performance representing differentiation and cost leadership strategies. The results suggest that firm performance could be more associated with the level of the TMT demographic property rather than its diversity and that TMT properties are associated with firm performance through differing paths representing differing strategies.

As expected, increasing TMT age had a negative effect on firm performance. The effect of increasing age and the deterioration of cognitive skills could be seen in both declining PM and ATO. These results support earlier findings on the effect of age (Chen, 2011; Sturman, 2003). Also, the mean age of the sample was 47.5 years placing it well into the declining part of age/performance curve (von den Driesch et al., 2015). Interestingly, increasing age had a stronger negative effect when pursuing a cost leadership strategy and measuring ATO than when pursuing a differentiation strategy and measuring PM. Ng and Feldman (2013) suggest the accumulation of experience and tacit knowledge make up to some extent for the decline in cognitive skills when aging. This might be beneficial when seeking a wider range of perspectives and measuring PM instead of seeking for congruence and measuring ATO.

Although TMT age diversity is expected to bring about elaboration and lead to better team performance (van Knippenberg et al., 2004), the social categorising leading to intergroup biases interferes with this link and impairs team performance. The effect was strong with congruence seeking TMTs measuring ATO and pursuing a cost leadership strategy. This supported Bell et al. (2011) notion that age diversity promotes separation and could be detrimental to team performance. On the other hand, the separation and personal conflict did not seem so detrimental when pursuing a differentiation strategy and measuring PM, the induced intergroup biases seemed to only cancel the positive effects expected from diversity. This suggests that the effects of diversity depend on what type of strategy the firm is pursuing.

Contrary to expectations, this study did not find a significant negative association between TMT firm tenure and PM. The effect was small and in the expected direction. On the other hand, the association with ATO was significant and suggests improved performance with increasing firm tenure. These results support the view that long firm tenures socialise or integrate organisation members and unify behaviours and perspectives. These uniform views promote convergence resulting in better performance when cost leadership and effectiveness strategies are pursued (Bell

et al., 2011; Hambrick, 2007). Unified views, accrued organisational know-how, and common communication practices do not seem to affect performance when differentiation and a wider range of perspectives are valued. Instead, when differentiation is key, diversity in firm tenure seems to improve performance as task-relevant information and perspectives are elaborated (van Knippenberg et al., 2004). When convergence is sought, elaboration of information and wider range of perspectives might not be beneficial and team performance does not improve with diversity. Instead, social categorisation may induce intergroup biases impairing performance. This finding underpins the relevance of the team's task, whether it is elaboration or convergence, and its effect on the diversity-performance link.

As expected, TMT team tenure was positively associated with firm performance. This finding supports findings in prior studies that TMTs integrate their behaviour or act more like a team resulting in improved performance (Bell et al., 2011; Hambrick, 2007). Thus, teams with longer team tenures develop effective team cognition with time as knowledge is accumulated and its distribution within the team is recognised and this is reflected in improved performance (Gonzalez-Mulé et al., 2020). Although differentiation was expected to benefit more from the increase in team tenure, the increase in performance was the same when measuring PM than ATO. Both differentiation and convergence benefit from the accumulation of knowledge within the team and the developments in the team's transactive memory system, i.e., increased awareness of who knows what. As Hambrick (2007) has noted, TMTs do not work as real teams, but more through bilateral relations with the CEO. When the interactions within the TMT are centralised around the CEO and there is little interaction between the other TMT members, increased knowledge about who knows what within the TMT could be restricted limiting the benefits for differentiation compared to convergence.

Diversity in TMT team tenure had a positive effect on PM and a negative effect on ATO. Although the effect was weak, the positive effect of team tenure diversity on PM suggests TMTs and firms pursuing differentiation strategies are able to utilise the different types of knowledge and perspectives resulting from the differences in tenures. The negative effect on ATO was expected. Even though diversity brings about different types of knowledge and perspectives leading to improved performance, the introduction of new team members leading to diverse team tenures can elicit social categorisation and cause a decline in performance when convergence is important. The strong effect of social categorisation might be caused by the way TMTs work. Hambrick (2007) noted that TMTs work through bilateral relations mainly with the CEO not really forming a team, but could integrate their behaviour with time. In such surroundings, social categorisation could be

more potent than within a real team. This is supported by Roh et al. (2019) findings that task- and relations-oriented diversity in TMTs increase relational conflict while reducing team cohesion, behavioural integration, and strategic consensus thus affecting negatively firm performance. Although variety induced by team tenure could improve performance in teams (Gonzalez-Mulé et al., 2020), it can impair performance in TMTs (Roh et al., 2019).

This study makes several contributions to existing knowledge on upper echelons and TMTs. First, the results suggest that not only diversity in the top management explains differences in firm performance. Although, diversity in a measured demographic property might be associated with firm performance, the level of this variable can have a stronger association with firm performance. Also, the association can be in opposing directions, e.g., the positive effects of increasing team tenure may be reversed by the negative effects of increasing team tenure diversity. Second, the current results highlight the importance of using variables that measure operating performance of the top management. Disaggregating these measures further to measure differing constructs of a firm's operations shows the different paths between TMT properties and firm performance. The varied size and direction of the association between TMT properties and the more detailed measures may help to explain the mixed and not significant results from prior research. Third, the findings suggest that diversity in top management is not always beneficial. Although diversity is often conceptualised as invoking new knowledge and perspectives leading to improved performance, it can also induce social categorisation and intergroup biases that impair performance (van Knippenberg et al., 2004) contingent on the TMTs need for divergence or convergence.

5.1   Managerial implications

This study also provides practical insights for executive groups and boards of directors. The results help to understand and utilise the separate effects of age, firm tenure, and team tenure on TMT and firm performance. While increasing firm and team tenures were found to have positive effects, increasing age works in the opposite direction. This suggests that adding young new TMT members with long firm tenures would be beneficial to TMT performance. On the other hand, avoiding changes and increasing team tenure would also improve performance.

The present study also demonstrates the effects of diversity on performance in different contexts. In general, diversity is expected to lead to elaboration of new ideas and wider perspectives resulting in better performance while social categorisation leads to intergroup biases that interfere with the diversity-elaboration link impairing performance (van Knippenberg et al., 2004). The results suggest TMTs of firms pursuing cost leadership strategies and effectiveness valuing convergence

are especially prone to social categorising within the TMT. This results in lower performance when age, firm tenure, and team tenure diversity increases. Firms pursuing innovation, creativity, and wider range of perspectives are less affected by social categorising and diversity can improve performance.

5.2   Limitations and directions for future research

While the results expand our knowledge on TMT and firm performance, there are limitations to this study. Considerable effort was made to collect a representative sample and avoid biases. Although the data consists of firms from five industries with multiple firms in each industry, it is a non-probability sample from a single country. This could decrease the generalisability of the results. RNOA and its disaggregates were chosen as performance measures to focus on the operational performance of the top management. Despite the suitability of the measures, the industry could cause categorisation in the sample and bias the results. Further studies in other countries using single and multiple industry data are therefore recommended. Also, the disaggregation of PM and ATO further might produce interesting results.

Although the Finnish business culture is near to other European business cultures, it might affect the results. The Finnish business culture is characterised by low power distance and high individualism (Hofstede, 2001). Low power distance implies low hierarchies, equal rights, and accessible superiors. On the other hand, high individualism suggests formal employer/employee relations and management is management of individuals. This might influence the bilateral relations within the TMTs.

The TMT was defined as the group the firm and the executives themselves perceive as the TMT in line with the definition of a team (Senior and Swailes, 2004). This however differs from most upper echelon studies where the research object is a fixed number of executive tiers seen from the outside. Diversity was conceptualised as separation along the guidelines of Harrison and Klein (2007). Also, the bias corrected measure of standard deviation was used to correct for varying group size (Biemann and Kearney, 2010). Comparability of the results to prior studies using the coefficient of variation (Allison, 1978) and uncorrected measures might be poor. Despite these limitations, the present study has provided new knowledge on the paths how TMT's properties are associated with firm performance.

6   References

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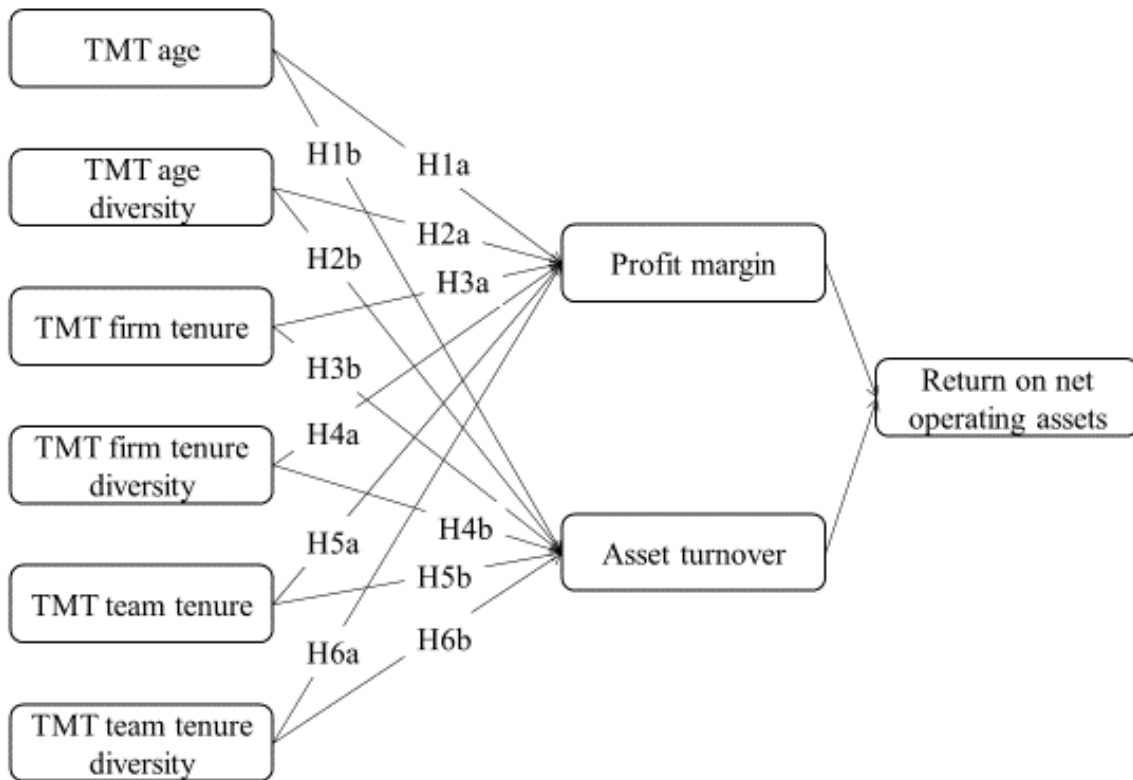
Figure 1. Theoretical model and hypotheses

Table I

Demographic data on firms and TMTs

	n	%
Panel A. Industry classification (ICB)		
Basic materials	10	11.2
Consumer goods	13	14.6
Consumer services	10	11.2
Industrials	40	44.9
Technology	16	18.0
Total	89	
Panel B. Firm size (personnel)		
0 - 250	8	9.0
251 - 500	15	16.9
501 – 1.000	18	20.2
1,001 – 5,000	21	23.6
5,001 – 10,000	13	14.6
10,001 -	14	15.7
Total	89	

Table II

Descriptive statistics and Pearson correlations (n = 320)

	Mean	SD	1	2	3	4	5	6	7	8	9
1. Age	47.51	3.40	1								
2. Age diversity	6.11	1.84	-0.05	1							
3. Firm tenure	8.97	4.54	0.51	-0.02	1						
4. Firm tenure diversity	7.39	3.38	0.48	-0.02	0.72	1					
5. Team tenure	2.43	1.85	0.22	-0.07	0.46	0.14	1				
6. Team tenure diversity	1.40	1.29	0.13	0.15	0.40	0.27	0.66	1			
7. PM, %	3.98	9.01	0.04	-0.04	0.17	0.16	0.24	0.23	1		
8. ATO	2.11	1.23	-0.15	-0.24	-0.01	-0.11	0.11	-0.06	0.10	1	
9. RNOA, %	9.56	16.93	-0.07	-0.11	0.11	0.10	0.16	0.10	0.78	0.50	1

All correlations above r=0.10 significant at p<0.05.

Table III

Results of the structural model

| | | Standardized estimates | | |
| | Variable | Path to: | | |
		PM	ATO	RNOA
H1a: TMT age is negatively associated with firm PM	Age	-0.09		
H1b: TMT age is negatively associated with firm ATO	Age		-0.22***	
H2a: TMT age diversity is negatively associated with firm PM	Age diversity	-0.03		
H2b: TMT age diversity is (strong) negatively associated with firm ATO	Age diversity		-0.19***	
H3a: TMT firm tenure is negatively associated with firm PM	Firm tenure	-0.01		
H3b: TMT firm tenure is positively associated with firm ATO	Firm tenure		0.19**	
H4a: TMT firm tenure diversity is positively associated with firm PM	Firm tenure diversity	0.11		
H4b: TMT firm tenure diversity is negatively associated with firm ATO	Firm tenure diversity		-0.15**	
H5a: TMT team tenure is (strong) positively associated with firm PM	Team tenure	0.16**		
H5b: TMT team tenure is positively associated with firm ATO	Team tenure		0.17**	
H6a: TMT team tenure diversity is positively associated with firm PM	Team tenure diversity	0.07		
H6b: TMT team tenure diversity is negatively associated with firm ATO	Team tenure diversity		-0.14*	
	TMT size	0.13**	-0.01	
	Firm size	0.01	0.13*	
	Industry 1	-0.08	-0.34***	
	Industry 2	0.09	-0.16***	
	Industry 3	0.13**	-0.07	
	Industry 5	0.03	-0.11**	
	Year 2	-0.26***	-0.14**	

Year 3	-0.07	-0.04	
Year 4	-0.06	0.02	
PM, %			0.74***
ATO			0.43***
R^2	0.18	0.25	0.77

$X^2 = 37.17$, df = 16, p = 0.002, CFI = 0.99, NFI = 0.98, RMSEA = 0.064, SRMR = 0.013

* $p < .10$, ** $p < .05$, *** $p < .01$

II

EXPLORING MANAGEMENT CONTROL SYSTEM TYPOLOGIES: AN ORGANISATION-LEVEL VIEW

by

Tapio Jukka & Jukka Pellinen, 2020

Exploring management control system typologies: An organisation level view

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Abstract

Purpose - Management controls are the processes and mechanisms managers use to influence the behaviour of individuals and groups towards the organisation's objectives and goals. Discrete management controls and management control system (MCS) frameworks have been extensively researched, but there is little research on organisation level MCS types. This study seeks to identify organisation level MCS types.

Design/methodology/approach - This study draws on the MCS type literature, the competing values framework, and the upper echelons theory to form organisation effectiveness and top management team constructs to characterise firms. Cluster analysis was used to group a sample of 318 firm-years into MCS types.

Findings - The study reports a theory-based measurement construct that is initially validated with new empirical data. We found from the empirical data four different categories of firms based on the general type of their MCSs labelled clan, adhocracy, market, and hierarchy.

Originality/value - This study makes two contributions to the MCS literature. Firstly, it presents a theory-based measurement construct to identify organisational and top management attributes that can be used to classify organisations overall MCS types. Secondly, it demonstrates how information from annual reports and other publicly available data sources can be used to identify the overall MCS types of organisations.

Classification Research paper

Keywords: Management control systems, typology, accounting data, cluster analysis

Exploring management control system typologies: An organisation level view

1   Introduction

Management control systems (MCS) are at the heart of our understanding of how management strives to achieve the objectives and goals of the organisation and explaining why organisations behave the way they do. Management controls are the processes and mechanisms managers use to influence the behaviour of individuals and groups towards predetermined objectives and goals (Flamholtz et al., 1985). These processes can include personal supervision, performance measurement, and reward systems. The control processes and mechanisms are not used separately. Instead, they are combined and used together as a MCS and various frameworks have been proposed to categorise and systematise these different combinations of management controls in place (e.g. Ferreira and Otley, 2009; Malmi and Brown, 2008; Simons, 1995).

MCS frameworks seek to specify and study the individual elements forming a MCS (Strauß and Zecher, 2013). MCSs have been understood as a collection of management control practices addressing diverse control and management problems. This view maintains that there is a collection of individual control practices and systems forming an MCS. In their MCS framework Malmi and Brown (2008) introduced the notion that the practices and systems in use form a package. Ferreira and Otley (2009) extended the understanding of MCSs by introducing an MCS framework, where the management control practices form a system of interrelated controls. These views of MCSs have formed separate literature streams and Grabner and Moers (2013) offered to clarify the distinctions and definitions of the package and system views.

Based on these frameworks, much of the MCS research has focused on the internal structure and interdependencies of the individual control practices within the MCS (Bedford and Malmi, 2015; Chenhall and Moers, 2015; Davila et al., 2015). How the organisation has addressed the fundamental task of organising, i.e. coordinating the activities of the organisation members with interdependent activities, using formal control systems, and social controls throughout the organisation is a fundamental property of the organisation (Chatman and O'Reilly, 2016). Taking a broader view of the organisation and how it addresses control as a whole, and not at the level of individual control practices or mechanisms, enables the overall characterisation and categorisation of a whole MCSs (Speklé, 2001). These MCS archetypes are specific and distinct

configurations of the control practices and systems in place and represent separate groups of differing control types (Speklé, 2001). Although typologies of management control and MCS types have been proposed (Ouchi, 1979; Speklé, 2001; Whitley, 1999), there is little empirical research on firm or organisation level MCS types in the extant literature on management control (Auzair, 2015; King and Clarkson, 2019).

Knowledge about organisational overall MCS types is important in understanding how organisations influence behaviour and strive towards their objectives. This study draws on the MCS type literature (Ouchi, 1979; Speklé, 2001; Whitley, 1999) to identify four organisation level MCS types. The competing values framework (CVF) (Quinn and Rohrbaugh, 1983) identifies four different organisation types each with differentiated and characteristic organisational effectiveness measures. These organisation types can be aligned with the identified MCS types. According to the upper echelons theory (Hambrick and Mason, 1984) the demographic properties of top management teams (TMT) can be used as proxies for their cognitive settings making it possible to predict firms' strategic actions from their executives' backgrounds. The CVF and the upper echelons theory are used to form organisation effectiveness and TMT constructs to characterise firms and identify the organisation level MCS types. To advance the understanding on MCS types, these constructs are used with cluster analysis to group a sample of 318 firm-years into four MCS types with distinct characteristics. It also addresses the call for theoretical insights and empirical findings on the influence of top management on designing, perceiving, and using MCSs (Schaeffer and Dossi, 2014) and a typology of MCS design (King and Clarkson, 2019; Otley, 2016).

The study makes two contributions to the current MCS literature. Firstly, it identifies organisational and top management attributes that can be used to classify organisations MCS types. Secondly, as a methodological contribution, it demonstrates the use of a theory-based model to empirically study overall MCS types of organisations using publicly available accounting and TMT data.

The rest of the study is structured as follows. The following section reviews the extant literature on MCS types, CVF organisation types, and defines the used constructs. The third section

describes the used data and measures, followed by the methods, results, and findings. The last section discusses the findings, implications, and limitations of the study.

2   Literature review

2.1   MCS types

In their review Strauß and Zecher (2013) identified several MCS typologies in the extant literature that were based on either a cybernetic approach, transaction cost economics (TCE), or comparative sociology approach. The TCE and comparative sociology-based typologies are more suited for typing whole MCSs, while the cybernetic based MCSs differentiate control mechanisms and processes (Strauß and Zecher, 2013). Table I summarises the main features of the TCE and comparative sociology approach based MCS typologies.

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Table I about here

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Based on the TCE approach Ouchi (1979) divides MCSs into evaluation and control systems using market, bureaucracy, and clan mechanisms. The typology of Lebas and Weigenstein (1986) is essentially the same division into three types with slightly differing names: market, rules, and culture approaches. In both typologies, external market mechanisms e.g. prices are used to control behaviour in the market type control. The bureaucracy and rules types use externally imposed rules and output controls to control behaviour. The third MCS types clan and culture use rituals, internalised beliefs, and values to influence behaviour.

Using the comparative sociology approach, Whitley (1999) introduced four different control systems in his typology. The output-based control systems are comparable with the market types of Ouchi (1979) or Lebas and Weigenstein (1986). In a comparable manner, bureaucratic control systems are like bureaucracy and rules, and patriarchal control systems resemble clan and culture types. Whitley (1999) introduces a fourth type delegated control systems in his typology, where control is exerted by autonomous groups or units in the organisation.

Speklé (2001) again applies the TCE approach and proposes five control types in his typology. Four control types are like the types presented in the prior typologies. Market and machine controls resemble the market and bureaucracy types in the earlier typologies. Speklé's (2001) boundary control uses interdicts and sets boundaries to limit unaccepted behaviour and is similar to clan, culture, or patriarchal controls. Exploratory control is based on interaction and the emergence of insights to achieve cooperation and resembles Whitley's (1999) delegated control systems. The fifth type, arm's length control, combines elements of the competitive market and administrative machine controls. Arm's length control does not correspond to any specific control type in the earlier typologies.

2.2   The competing values framework

The competing values framework proposed by Quinn and Rohrbaugh (1983) has been widely used in analysing organisations (Hartnell et al., 2011). The spatial framework consists of three value dimensions (control-flexibility, internal-external, and means-ends) that underlie conceptualisations of organisational effectiveness, see Figure 1. The first dimension reflects organisational structure with values of control and stability to flexibility and individuality. The second dimension differentiates organisational focus from an internal view on the well-being and development of the people in the organisation to an external view on the organisation itself. The four quadrants formed by these two main dimensions represent the four types of organisations that form the CVF: clan, adhocracy, market, and hierarchy. The third dimension distinguishes emphasis on means or important processes from the ends or results within each quadrant. The CVF provides a tool to define the organisational effectiveness measures in terms of associated values and linking appropriate management controls to each type of organisation in the four quadrants (Cooper and Quinn, 1993).

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Fig. 1 about here

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The clan or the human relations model in the CVF is internally oriented and is characterised by a flexible organisation structure. Clan organisations are process oriented and ideally, leadership is very caring and empathetic showing concern and support (O'Neill and Quinn, 1993).

Participation and empowerment are used as means to bring about human resource development and employee commitment as ends (Hartnell et al., 2011).

The adhocracy or the open systems model is also characterised by a flexible organisation structure but is externally oriented focusing on the organisation itself. Their organisation structures are described as organic, flat, or loosely coupled systems (O'Neill and Quinn, 1993). Using flexibility, agility, and creativity as means adhocracies are expected to turn out innovation, growth, and resource acquisition as ends (Hartnell et al., 2011; Quinn and Rohrbaugh, 1983).

The market or rational goal model is similarly externally oriented but exerts control with its rigid control structures and mechanism (Hartnell et al., 2011). Market organisations focus on initiating action and achievement when attempting to fulfil their stakeholders' expectations. Using planning and goal setting as means, market organisations are expected to result in productivity and efficiency as ends (Quinn and Rohrbaugh, 1983).

The hierarchy or internal process model combines rigid control structures and mechanisms with internal focus. Their organisation structures are often hierarchies combined with conservative or cautious style leadership (O'Neill and Quinn, 1993). Hierarchies expect to achieve control, stability, and predictability as ends using communication and information management as means (Quinn and Rohrbaugh, 1983).

2.3   *Four types of control and top management properties*

Four contrasting organisation models emerge from the CVF. Quinn and Rohrbaugh (1983) found these four types to be congruent with earlier typings in the organisational literature. Furthermore, the MCS types in Table I can also be merged with the CVF. The clan, market, and hierarchy organisation types in the CVF have direct counterparts in the MCS types (Büschgens et al., 2013; Yu and Wu, 2009). The human relations approach of the clan model corresponds with the clan, culture, patriarchal, and boundary control types, see Table I. Similarly, the rational goal-oriented approach of the market model matches the market and output-based control types and the hierarchy corresponds with the bureaucracy, rules, and machine control types. The open systems adhocracy juxtaposes with the delegated and exploratory control types of Whitley (1999) and Speklé (2001) with emerging insights and autonomy central in accomplishing control.

Quinn and Rohrbaugh (1983) used organisation effectiveness measures applied in organisation analysis to differentiate the four organisation types. In their typology, each quadrant or organisation type has distinctive organisation effectiveness criteria or measures that separate them from each other. The CVF literature that followed has listed an array of organisation properties and measures characteristic for each organisation type (e.g. Hartnell et al., 2011; O'Neill and Quinn, 1993; Zammuto and O'Connor, 1992). Since each organisation type has distinctive and identifiable effectiveness criteria and measures, the organisation and control types can be differentiated and identified from these measures.

According to the upper echelons theory (Hambrick and Mason, 1984) the actions and performance of organisations can be understood through the properties of their most powerful actors, the top management team. The top executives form personal interpretations of the challenges they face based on their personal experiences, values, and personalities, and act according to these interpretations (Hambrick, 2007). The upper echelons theory also holds the view that demographic properties of the TMTs can be used as proxies for their cognitive settings making it possible to predict strategic actions from the executives' functional backgrounds, business or firm tenure, educational background, and other affiliations (Hambrick, 2007). Thus, the top managements demographic properties reflect the organisation and control type as top management has been found to influence organisation culture and values (Bhimani, 2003; Hu et al., 2012), use the organisation culture and values as a control system (Chatman and O'Reilly, 2016; Marginson, 2009), or align their control system with the prevalent organisation culture (Heinicke et al., 2016).

In conclusion, the management control literature has identified MCS types that are linked to the organisation types in the CVF. The top management influences the organisation type and the management controls used within the organisation. Ensuing from the upper echelons theory, the top management demographic properties reflect the organisation's culture type and management controls used to influence behaviour and strive towards their objectives. According to the CVF, each organisation and control type promotes and uses distinctive effectiveness criteria or measures to assess organisation performance. A set of organisation and TMT constructs can be identified to differentiate and categorise the organisation and MCS types. Although an unlimited number of constructs could be chosen, a limited number of uncorrelated constructs allow valid

patterns to emerge from a configuration analysis (Bedford and Malmi, 2015). The constructs included in the empirical analysis are drawn from the extant CVF literature and represent organisation properties and measures characteristic to the different CVF models. The fourteen organisation and TMT constructs used in the clustering analysis and validation are discussed next and summarised in Table II.

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Table II about here

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TMT size and firm size were chosen as organisational constructs for the clustering. While increasing TMT size has been found to improve firm performance (Certo et al., 2006) due to increased ability to process information, Haleblian and Finkelstein (1993) note increasing TMT size creates communication and coordination problems. In this light, adhocracy control seeking agility should display small TMTs able to make swift decisions. While adhocracy control values agility, hierarchy control emphasizes stability with larger TMTs (Cameron and Lavine, 2006; Quinn and Rohrbaugh, 1983). Firm size measured as number of employees has been shown to separate small firms with capability to change and adapt (Abebe, 2010) from larger more rigid and bureaucratic firms (Baliga and Jaeger, 1984).

The upper echelons theory maintains that the functional backgrounds of TMTs influence their decisions and actions, and classifies them into three categories: output, throughput, and peripheral functional backgrounds (Hambrick and Mason, 1984). Output functions include marketing, sales, and R&D (Abebe, 2010). TMTs with output functional backgrounds emphasise growth and search for new opportunities and markets (Hambrick and Mason, 1984). Adhocracy and market control should display a higher share of output functional backgrounds since the CVF associates growth with adhocracies, while search for new opportunities and markets are linked with market organisations (Hartnell et al., 2011; Zammuto and O'Connor, 1992). TMTs with throughput functional backgrounds seek to improve the efficiency of the transformation process and include production, process engineering, and accounting (Abebe, 2010; Hambrick and Mason, 1984). According to the CVF, process oriented leadership is linked with clan control, while improvement-oriented leadership is a feature of adhocracy control (O'Neill and Quinn,

1993; Wang et al., 2015). Therefore, throughput functional backgrounds should be more common with these control types.

TMT members with peripheral functional backgrounds, e.g. law, finance, personnel, and administrative backgrounds, are not directly involved with the organisations core activities (Hambrick and Mason, 1984). Clan control in the CVF values teamwork, participation, and human resource development, which should lead to higher share of peripheral functional backgrounds in the TMT (Hartnell et al., 2011). Peripheral functional backgrounds are also beneficial in formal planning, maintaining structures, and coordination typical of hierarchy control and goal oriented market control (Hambrick and Mason, 1984; O'Neill and Quinn, 1993). Koch et al. (2017) noted that there is a large share of top executives, that have general management backgrounds instead of functional ones. TMT members with general management backgrounds have moved away from specific functions and possess generic governance expertise (Biemann and Wolf, 2009; Koch et al., 2017). General management backgrounds are common in long tenured top management of large corporations as managers perform more general management duties than special tasks (Koch et al., 2017). Governance and management expertise benefit organisations emphasising control making general management backgrounds more pronounced within hierarchy and market control.

The upper echelons theory assertion that TMT age, organisation tenure, and team tenure are related to performance has received substantial support (Bell et al., 2011; Hambrick, 2007). TMT age has been shown to be associated with firm strategic change (Wiersema and Bantel, 1992). Younger TMTs were more receptive to change and willing to take risks while older TMTs became less flexible and avoided risky decisions. Correspondingly, adhocracies in the CVF are agile and risk taking while hierarchies value caution and stability (Hartnell et al., 2011; Zammuto and O'Connor, 1992). Hence, adhocracy control should exhibit younger TMTs and hierarchy control older TMTs. In a similar manner, long tenured TMTs have been found to resist change and maintain organisational status quo (Boeker, 1997). Long tenures should be common with hierarchy control seeking to maintain existing structures (O'Neill and Quinn, 1993). Baliga and Jaeger (1984) noted that long organisational tenure is needed for clan control. Long tenure can also have a negative effect on the agility of adhocracy control and environmental scanning of market control (Abebe, 2010; Hartnell et al., 2011). Thus, the TMTs of clan and hierarchy

organisations have longer tenures than TMTs of adhocracies and market organisations. TMTs have been observed to integrate their behaviour as team tenure increases (Hambrick, 2007). Congruent behaviour due to long team tenure is valued by clan control where teamwork, personnel development, and empowerment are emphasised (Hartnell et al., 2011). In turn, market control could show short team tenure as it focuses on achievement and short-term results (Hartnell et al., 2011) and control relies on agreed outputs (Ouchi, 1979).

To assess predictive validity, additional variables not included in the cluster solution are chosen and tested for differences (Hair et al., 2015). Profit margin reflects the firm's efficiency and management's capability to control the costs to generate sales (Fairfield and Yohn, 2001). Effectiveness is associated with hierarchy control (Cameron and Lavine, 2006; Hartnell et al., 2011). In contrast, asset turnover represents productivity and the effective use of the firm's assets (Fairfield and Yohn, 2001). In the CVF, market control is expected to show high productivity (Cooper and Quinn, 1993; Quinn and Rohrbaugh, 1983).

The MCS types also differ on organisational measures like growth and innovation. Adhocracy control strives to grow and acquire resources (O'Neill and Quinn, 1993; Quinn and Rohrbaugh, 1983), while clan control intensifies during organisational decline and when losing resources (Harrison and Carroll, 1991). Organisational growth and decline can be measured as changes in personnel (Hartnell et al., 2011). Adhocracy control stresses innovation, while market organisations focus on increasing market share. Both emphasize innovation effectiveness measures compared to clan and hierarchy control (Cameron and Lavine, 2006; Zammuto and O'Connor, 1992). R&D intensity or R&D expenditure of sales is widely used as a measure of corporate innovativeness (Baysinger and Hoskisson, 1989; Hambrick and Macmillan, 1985).

Clan control emphasizes nonspecialised career paths and teamwork benefiting from high diversity (Baliga and Jaeger, 1984; Hartnell et al., 2011). TMT diversity brings different types of knowledge and a wider range of perspectives valued by market control (Certo et al., 2006). According to Cameron and Lavine (2006) hierarchies value consistency and uniformity expressed as low diversity. Educational background diversity proxies the TMT diversity.

This section attempted to provide a brief summary of the literature relating to CVF organisation models and MCS types. The evidence reviewed here suggests that organisation level MCS types

can be identified and they correspond to the four organisation types identified in the CVF. By means of the CVF organisational effectiveness criteria and top management characteristics, MCS types can be identified and characterised from sample organisations.

3 Research methodology

3.1 Data

The sample was collected from firms listed in the NASDAQ OMX Helsinki stock exchange during 2008-2011. The Finnish Corporate Governance Code applied by the stock exchange requires operative management is separate from the board of directors and firms disclose organisation of the management. If the company has a management team, its composition and duties as well as the areas of responsibility of its members shall be disclosed. This sample was chosen as Finnish companies readily publish information on their TMTs and the very interesting time period included both economic downturn and recovery.

The sample included firms in basic materials, consumer goods, consumer services, industrials, technology, and telecommunications industries. The single firm in the telecommunication industry resembles the consumer goods and services firms warranting its inclusion in the sample. Financials were excluded as their assets and liabilities differ considerably from the sample. Health care and utilities are regulated industries and thus were left out. The oil & gas industries consisted of one state owned firm which was excluded not to risk generalisability of the results. One firm was deemed an outlier based on Euclidian distance (Hair et al., 2015) and six firms were excluded due to missing data leaving 83 firms with 318 firm-years of data in the sample. Demographic data for the sample is presented in Table III.

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Table III about here

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The accounting data used in this study was collected from the Voitto+ company information database published by Asiakastieto Group. The used data was published in November 2012. The top management team was defined as the group of top executives the firms declare as their top management team in their annual reports. This corresponds with Senior and Swailes (2004)

definition of a real team where the group see themselves as a team and is also seen by outsiders as a team. This definition is also applicable to different size organisations as the firms define the size and composition of the TMT needed to manage the organisation. Reliable and up to date information on the TMTs is readily available in the firms' published and audited annual reports and stock exchange releases. This information was supplemented with information from firm internet pages and TMT member LinkedIn profiles.

3.2   Measures

TMT size was the number of persons in the team. Firm size was measured as the mean number of employees during a fiscal year.

The functional background variables were calculated as the share of managers with the corresponding background in the top management team. Consistent with prior studies (Abebe, 2010; Hambrick and Mason, 1984), top management team functional backgrounds were categorised as throughput, output, and peripheral functions. Throughput functions seek to improve the efficiency of the transformation process and include production, process engineering, and accounting. Output functions include marketing, sales, and R&D. They emphasise growth and search for new opportunities and markets. Peripheral functions (e.g. law, personnel, finance) are not directly involved with the firm's core activities. A fourth category, general management, was added as not all managers have specific functional backgrounds, but instead have broader general management backgrounds e.g. division heads (Biemann and Wolf, 2009).

TMT age, firm tenure, and team tenure were measured as simple averages of team member age and tenures for each fiscal year.

Firm profitability expressed as return on assets (ROA) was separated into profit margin (PM) and asset turnover (ATO) (Fairfield and Yohn, 2001). Profit margin was calculated as profit (net profit before taxes and finance costs) in relation to total sales. Asset turnover was calculated as total sales divided by average assets, where average assets were the mean of the balance sheet totals for the current and the previous year.

Organisation growth was represented by increases in number of employees (Hartnell et al., 2011). Accounting based data was used to calculate growth of the organisation as the annual change in average number of personnel.

R&D intensity of the organisations was measured as the annual R&D expenditure divided by total sales (Baysinger and Hoskisson, 1989; Hambrick and Macmillan, 1985). Although one of the most commonly used measures of R&D intensity, it may be affected by firm size or industry (Baysinger and Hoskisson, 1989). Hambrick and Macmillan (1985) also point out the time dimensional problems with R&D intensity as the results of R&D expenditures are seen in later time periods. Despite this, no lags were used for parsimony.

Top management team educational background diversity was conceptualised as variety, and Blau's index of heterogeneity was used as measure (Harrison and Klein, 2007). Due to variation in top management team size, a bias corrected formula of Blau's index was used (Biemann and Kearney, 2010). The index gives values from 0 to 1 with increasing diversity. Analogous with prior studies the educational backgrounds of the TMT members were grouped into five categories used by Wiersema and Bantel (1992): arts, sciences, engineering, business and economics, and law. When more than one field of education was reported, the first one was taken to be the dominating field. Also "not indicated" was added as a sixth group. Some individuals did not report their education, and this was taken as a distinguishing factor from the rest of the group.

4   Findings

Descriptive statistics for the sample are shown in Table IV. The sample consisted of 318 firm-years in six industries. The correlation matrix in Table IV shows plausible associations between the variables. While there is some correlation between the functional background measures and the temporal measures, the highest correlation is -0.63 between output functional and general management backgrounds. The pairwise correlations are well below the generally accepted limit of 0.70 suggesting no concerns with multicollinearity (Hair et al., 2015).

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Table IV about here

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A combination of hierarchical and non-hierarchical clustering methods was employed to investigate organisation level MCS types. Cluster analysis was chosen, as it is commonly used to group objects into homogenous clusters, which differ from objects in the other clusters (Hair et al., 2015). Hierarchical cluster analysis using squared Euclidian distance as similarity measure and Ward's method as clustering algorithm was first used to generate a full set of cluster solutions. The variables were standardised using Z-scores to avoid variables with large ranges getting more weight in defining the cluster solution and dominating the result (Ketchen and Shook, 1996). The number of clusters was determined using increase in heterogeneity measured by the agglomeration coefficient (Hair et al., 2015). Heterogeneity increased significantly when reducing the number of clusters from four to three indicating the clustering should be stopped at four clusters.

The four-cluster solution from the hierarchical cluster analysis was further optimised using non-hierarchical K-means clustering, which allows the reassignment of observation into other clusters while minimising heterogeneity (Hair et al., 2015). Software generated seed points were used to produce a four-cluster solution with 74, 85, 113, and 46 cases in the clusters. Table V shows the results of the analysis, the analysis of variance (ANOVA), and the post hoc multiple comparison procedure used to compare the means. Levene's test confirmed that some variances are not equal and cluster sizes differ, making the Welch F-statistic and the Games-Howell post hoc test appropriate choices (Howell, 2008). The robustness and validity of the cluster solution was tested using different seed points for the K-means clustering. This resulted in 95.9% of the cases being grouped in the correct cluster. A cluster solution is considered very stable when less than 10% of the cases are assigned incorrectly (Hair et al., 2015).

The cluster solution was further validated by inspecting how each firm classified during the four-year period. Sixty-five firms were grouped in the same cluster for the whole period, while 29 shifted to another cluster. The annual reports of the 29 firms were analysed for reasons for the shift. Most of these shifts (15) were from clan, adhocracy, or hierarchy clusters to the market

cluster. All these firms reported adopting more customer or market-oriented operations or strategies. Five firms moved from adhocracy or market clusters to the clan cluster. These firms displayed very stable operations with the organisation and same TMT growing older. Four firms shifted to the adhocracy cluster from clan or market clusters while reporting major downsizing or divesting large parts of their business. Overall, 78 firms grouped in the same cluster or had plausible reason for a cluster shift and only five firms with shifts could not be explained. These results support the cluster solution.

The four clusters are interpreted in the next sections based on the differences in the clustering variables (Table V), validation variables (Table VI), and comparisons to prior theoretical typologies. These descriptions provide an understanding of the type of control used within each cluster and allow labelling it accordingly. Furthermore, the validation variables show differences between the clusters indicating the predictive validity of the cluster solution.

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Table V and VI about here

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4.1   Cluster 1: Clan control

Cluster 1 consists of 74 cases (23% of the total sample). TMT and organisation size are close to the sample mean and do not differentiate this cluster. The backgrounds of the TMT differ from the other clusters significantly. All the backgrounds are evenly represented in the TMT of this cluster and it also has the highest share of managers with peripheral functional backgrounds. This suggests a propensity towards human resource development, participation, and teamwork valued by organisations with an inclination towards clan control (Hartnell et al., 2011). Cluster 1 also exhibits a long firm tenure of the TMT and the longest team tenure (twice the team tenure of the other clusters). Baliga and Jaeger (1984) have noted the need for long tenures and consensual decision-making to induce clan control.

Firms in cluster 1 exhibit slightly better than average profitability, but low asset turnover. Clan control can be effective in organisations where output or behaviour cannot be accurately measured and controlled, instead ritualised ceremonial forms of control are utilised (Ouchi,

1979). In such organisations, individuals are reminded of organisational and personal goals although their achievement is not always measurable. This may lead to low efficiency measured as asset turnover, when individuals are empowered to accomplish their tasks in various ways. Low organisational growth (measured as growth in personnel) in cluster 1 also suggests clan control as cultural controls have been shown to intensify during organisational decline (Harrison and Carroll, 1991).

4.2   Cluster 2: Adhocracy control

Cluster 2 groups 85 cases (27% of the total sample). Firms in cluster 2 can be characterised as agile. Small organisations with a small TMT suggest flat and adaptive organisation structures that are flexible and adaptive to changes in the environment (Villalba, 2006). Background properties of the TMT in this cluster also suggest growth and agility as characteristics for these organisations suggestive of adhocracy control. Cluster 2 has the highest share of top managers with output and throughput functional backgrounds. Output functional backgrounds have been linked with increased environmental scanning by the TMT in search for growth opportunities (Cho, 2006), while throughput functional backgrounds have been shown to have a positive effect on firm performance and innovation (Wang et al., 2015). Interestingly, cluster 2 TMTs have almost no members with peripheral functional backgrounds. These managers are not involved with the firm's core activities and might not improve adaptability, creativity, and agility these organisations value (Hartnell et al., 2011). Cluster 2 TMTs are the youngest and shortest tenured supporting a view of agility and innovation as increasing age has been linked with risk avoidance (Wiersema and Bantel, 1992) and increasing tenure with less flexibility and environmental scanning (Abebe, 2010; Hartnell et al., 2011).

Growth, innovation, research, and development characterise the firms in cluster 2. These organisations are highly innovative reflected in their high innovation intensity and show high growth in personnel. Adhocracies have been characterised as seeking growth through innovation and research (Quinn and Rohrbaugh, 1983). Also, adhocracies do not only seek growth per se, they also strive to acquire resources suggested by the growth in personnel, a highly valued resource (O'Neill and Quinn, 1993).

4.3 Cluster 3: Market control

The largest cluster 3 holds 113 cases (36% of the total sample). Firms in cluster 3 have the second largest TMT, but second smallest organisation. The TMT is characterised by a large share of managers with general management backgrounds. This suggests these firms rely on governance competencies the managers have picked up during their careers (Biemann and Wolf, 2009). Compared to the other clusters, the firm and team tenures are short indicating a TMT with more willingness to change or initiate new strategies (Wiersema and Bantel, 1992). These attributes are valued by firms exerting market control and displaying directive and goal-oriented leadership (Hartnell et al., 2011; Zammuto and O'Connor, 1992). Firms in cluster 3 also display a higher share of top management with output functional backgrounds than cluster 4. Marketing, sales, and R&D are important functions for market control, which stress customer focus and competitor information as effectiveness measures (Hartnell et al., 2011).

4.4 Cluster 4: Hierarchy control

Cluster 4 groups 46 cases (15% of the total sample). Firms in cluster 4 are large and their TMTs are larger than in the other clusters. Organisations tend to become more bureaucratic and hierarchical as their size increases suggesting the use of hierarchy controls within these firms (Baliga and Jaeger, 1984; Mintzberg, 1996). The top management of cluster 4 has predominantly a general management background and long firm tenure suggesting these firms value stability and control demonstrated by long tenured managers having ascended the organisation in general management positions and gaining experience needed to control large organisations (Biemann and Wolf, 2009). The emphasis on internal control and coordination could also be seen in the presence of peripheral functional background expertise and the absence of outward scanning managers with output functional backgrounds.

Cluster 4 is also characterised by high a profit margin suggesting the effective use of the firm's assets (Fairfield and Yohn, 2001). Hierarchies in the CVF favour efficiency, control, and stability effectiveness criteria (Cameron and Lavine, 2006; Quinn and Rohrbaugh, 1983).

5   Concluding discussion

The overall MCS type in organisations is a key element in understanding why organisations behave the way they do. The overall MCS type implies what forms of management controls are used to influence the behaviour of individuals and groups in the direction of the organisation's objectives and goals. The top management influences the organisation type and the management controls used within the organisation, which can be identified from distinctive organisation and TMT effectiveness measures. Although the literature proposes several typologies for overall MCSs to be observed at the organizational level, there has been little research on organisation or firm level MCS types. This study contributes to the MCS literature by advancing the understanding of MCS types through exploring and identifying firm level MCS types.

The present study makes several contributions to the MCS literature. It identified four distinct MCS types in the sample firms using publicly available data on top management demographic properties and financial performance. The top management is instrumental in moulding the management accounting and organizational control systems used in their organisation. The upper echelons theory (Hambrick and Mason, 1984) asserts the demographic properties of the TMT can be used as proxies for their cognitive settings making it possible to predict their strategic actions. As a result, TMT demographic properties reflect the overall MCS type of organisations. According to the CVF (Quinn and Rohrbaugh, 1983), the different organisation and control types within the framework emphasize distinctive effectiveness criteria or measures to assess organisation performance. This study used the distinctive organisation and TMT properties to identify the four organisation MCS types. The identified four groups were empirically supported by the applied cluster analysis stopping rule and conceptually supported by interpretation of the clusters based on the CVF and extant MCS typologies (Ouchi, 1979; Quinn and Rohrbaugh, 1983; Speklé, 2001; Whitley, 1999).

In their study on organisation types, Tsui et al. (2006) also determined a four-cluster solution as the optimal and fitting the four CVF organisation types and the clan, market, and bureaucracy MCS types of Ouchi (1979). More recently, Bedford and Malmi (2015) explored configurations of control and how different management controls combine as a package. They identified five combinations of controls and discovered they resemble ideal MCS types found in the extant

literature. Consistent with these survey studies, this research identified four MCS types using publicly available accounting data instead. The four groups in this study showed distinct organisational and managerial properties portraying the types of management controls in place typical for each organisation. These findings extend our understanding of ideal MCS types and the conceptualisation of the overall MCS within the literature on the contingency theory of management accounting and control (Otley, 2016).

The study also identified organisation and top management attributes that could be used in future organisational level studies on overall MCSs. The identified attributes proxied the underlying effectiveness criteria and behaviours of the organisations indicating the MCS types in place. The Clan cluster exhibited empowerment in achieving goals with high profitability and low asset turnover emphasizing the results over the means. The clan MCS type also showed propensity towards teamwork, participation, and human resource development by employing a large TMT with diverse functional backgrounds and long tenures. Bedford and Malmi (2015) found their hybrid control displayed similar properties as participation, delegation, and interaction, while Tsui ei al. (2006) found clan organisations to be internally integrative and adaptive Organisation climate and culture research has found clan or human relations organisations exhibit similar attributes as participation, welfare, training, and effort towards mutual goals (Patterson et al., 2005).

The adhocracy type firms are characterised by agility, growth, and high innovation intensity. Tendency towards agility and innovation also appear in the TMT properties as small young TMTs with a high number of managers with output functional backgrounds and short tenures pointing towards active environmental scanning and urge to change. This finding is supported by earlier research showing that adaptive organisations are aware of their environment and anticipate possible changes therein and are ready to change if needed (Costanza et al., 2016). These organisations have been shown to actively develop capabilities and gather resources to sustain change (Costanza et al., 2016). Similar properties were also identified by Bedford and Malmi (2015) in their devolved control which they noted resembled an adhocracy.

Goal orientation and willingness to change characterise firms in the market cluster. The fairly large TMTs have a high share of managers with general management backgrounds. These firms

rely on competent governance from their top management. At the same time the TMTs also show willingness to change or initiate new strategies suggested by their low age and short tenures. Previous studies have found TMTs with lower age and shorter tenures to initiate strategic change in their organisations more often than older and longer tenured TMTs (Wiersema and Bantel, 1992). Goal oriented market control also characterises Bedford and Malmi's (2015) results control type. Market type organisations have also been found to emphasise external customer orientation (Tsui et al., 2006).

Large size, effective use of assets, and high productivity are characteristic for the hierarchy cluster firms. Efficiency, control, and stability are sustained by top management with general management experience, long firm and team tenures. Organisations structured as hierarchies have been shown to be efficient when performing routine tasks based on authority and expertise concentrated at higher levels of the organisation (Adler, 2001). Bedford and Malmi (2015) identified simple and action control types both stressing hierarchies, centralised authority, and restricted autonomy as their control mechanisms. Tsui et al. (2006) also noted a hierarchy organisation type utilising rules, policies, and formal procedures.

As a methodological contribution this study demonstrated a new possibility for theory-based empirical research on MCSs. A theory-based model was used to build linkages between organisation and TMT demographic properties and overall MCS types of organisations. The empirical study validated the use of publicly available accounting and TMT data of the firms as proxies for overall MCS type. Extant MCS research has used survey questionnaires as their predominant method (Otley, 2016). Although adequate attention has been given to the development and testing of the survey instrument, the data can still be biased and contain noise (Bedford et al., 2016). This study used publicly available audited data and did not rely on the subjective assessment of managers often used in surveys. The data used in this study is more objective than the data from surveys but bears some limitations as well. Survey and case study methodologies are still needed in making detailed or rich observations of the MSCs, but this study sets forth a new construct to measure organizational level MCSs.

Although the results provide new information on organisation level MCS types, there are limitations to this study. First, cluster analysis can be criticised as being too effective and always

producing clusters, even though there might not be any logical basis for the result. The cluster solution must be theoretically supported to bear any logical meaning. The selected cluster solution results can be further confirmed by using stopping rules, but cluster analysis lacks the means to test the significance of presented solution. Although the clustering using different seed points suggests the cluster solution is very stable, the result should not be taken as conclusive support for the four MCS types. Further research is needed to verify the number of MCS types and clusters, as there is support for several configurations of MCS types in the extant literature.

While considerable effort was made to get a generalisable sample, the data used may have biases. Although the sample consisted of firms from six industries and multiple MCS types were present in each industry, the data was limited to a single country. Also, the limited size of the sample might affect the cluster solution. Cluster analysis does not set strict requirements for sample size, but each cluster should have a sufficient number of firms to be representative and distinguish small groups from outliers. Since the study used a single country sample, there is a need to empirically explore MCS types in cross-cultural settings and with larger and more recent samples. Despite these limitations, the present study has provided additional evidence with respect to organisation level MCS types and how top management seeks to control their organisations.

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Table I Comparison of MCS typologies and the competing value framework (Hartnell et al., 2011; Lebas and Weigenstein, 1986; Ouchi, 1979; Quinn and Rohrbaugh, 1983; Speklé, 2001; Whitley, 1999)

Ouchi	Lebas and Weigenstein	Whitley	Speklé	CVF
TCE approach	TCE approach	Comparative sociology approach	TCE approach	
Market mechanisms Prices and market mechanisms	*Market approach* External market forces control behaviour	*Output-based control systems* Reliance on performance measures to control activities	*Market control* Control based on competition	*Market* Control is achieved with clear objectives and achievement-based rewards
			Arm's length control Quasi-independent control of outcomes	
Bureaucracy mechanisms Specified rules of behaviour and process	*Rules approach* Externally imposed procedures and output controls	*Bureaucratic control systems* High level of formalisation with written rules and procedures	*Machine control* Administrative control of behaviour or pre-set goals	*Hierarchy* Clear roles, formal rules, and regulations exert control
Clan mechanisms Ritualised, ceremonial forms of control	*Culture approach* Internalised beliefs and values control behaviour	*Patriarchal control systems* Direct supervision and personal contacts in monitoring and control	*Boundary control* Administrative control using interdictions or unaccepted behaviour	*Clan* Affiliation, reliance, and participation control behaviour
		Delegated control systems Autonomous groups and units control performance	*Exploratory control* Administrative control through emerging insights that accrue and are spread	*Adhocracy* Grasping the importance and impact of the task drives control

Table II Summary of the TMT and organisation constructs

Construct	Empirical evidence			
	Clan	**Adhocracy**	**Market**	**Hierarchy**
Clustering constructs				
TMT size		Small[f]		
Firm size		Small[c]		Large[b]
Output functional background		High[i,n]	High[i]	
Throughput functional background	High[k]	High[m]		
Peripheral functional background	High[i]		High[g,k]	High[g,k]
General management background			High[j]	High[j]
TMT age		Low[i,n]		High[i]
Firm tenure	Long[b]	Short[i]	Short[a,i]	Long[k]
Team tenure	Long[i]		Short[i]	
Validation constructs				
Profit margin				High[c,i]
Asset turnover			High[e,l]	
Personnel growth	Low[k,l]	High[h]		
R&D expenditure of sales	Low[c]	High[n]	High[c]	Low[n]
Educational background diversity	High[b,i]		High[d]	Low[c]

[a] Abebe, 2010; [b] Baliga and Jaeger, 1984; [c] Cameron and Lavine, 2006; [d] Certo et al., 2006; [e] Cooper and Quinn, 1993; [f] Haleblian and Finkelstein, 1993; [g] Hambrick and Mason, 1984; [h] Harrison and Carroll, 1991; [i] Hartnell et al., 2011; [j] Koch et al., 2017; [k] O'Neill and Quinn, 1993; [l] Quinn and Rohrbaugh, 1983; [m] Wang et al., 2015; [n] Zammuto and O'Connor, 1992

Table III Demographic data

	n
Panel A. Industry classification	
Basic Materials	7
Consumer Goods	13
Consumer Services	10
Industrials	37
Technology	15
Telecommunications	1
Total	83
Panel B. Firm size (personnel)	
0 - 250	6
251 - 500	13
501 – 1,000	17
1,001 – 5,000	21
5,001 – 10,000	13
10,001 -	13
Total	83

Table IV Descriptive statistics and Pearson correlations (n = 318)

Variable	Mean	SD	1	2	3	4	5	6	7	8	9
1. TMT size, persons	7.39	2.53	1.00								
2. Firm size, persons	5,318	7,613	0.24**	1.00							
3. Output functional background, %	21.41	17.36	0.05	-0.34**	1.00						
4. Throughput functional background, %	25.25	15.52	-0.32**	-0.18**	-0.00	1.00					
5. Peripheral functional background, %	15.95	13.74	0.21**	0.12*	-0.31**	-0.34**	1.00				
6. General management background, %	37.36	20.95	0.05	0.34**	-0.63**	-0.52**	-0.15**	1.00			
7. TMT age, yr	47.49	3.51	0.05	0.33**	-0.24**	-0.14	0.10	0.23**	1.00		
8. Firm tenure, yr	9.17	4.62	0.22**	0.44**	-0.17**	-0.02	0.09	0.10	0.52**	1.00	
9. Team tenure, yr	3.92	2.28	-0.02	-0.03	0.07	0.14*	0.08	-0.21**	0.33**	0.49**	1.00

* p < .05, ** p < .01

Table V Results of the K-means clustering

Cluster	1 Clan	2 Adho-cracy	3 Market	4 Hier-archy	ANOVA F-Stat[a]	Sig.	MCP Games-Howell[b]
TMT size, persons	7.69	6.04	7.89	8.20	17.13	0.000	1.3.4>2
Firm size, persons	4,160	1,047	3,619	19,246	77.04	0.000	4>1.3>2
Output functional background, %	25.86	33.95	15.04	6.73	52.11	0.000	1.2>3>4
Throughput functional background, %	27.78	38.04	16.64	18.72	45.29	0.000	2>1>3.4
Peripheral functional background, %	22.67	6.37	19.40	14.42	30.20	0.000	1.3*>4*>2
General management background, %	23.69	21.64	48.92	60.13	127.47	0.000	4>3>1.2
TMT age, yr	49.11	45.03	47.13	50.31	35.41	0.000	4*>1*>3>2
Firm tenure, yr	12.90	5.96	7.07	14.28	96.31	0.000	1.4>3>2
Team tenure, yr	6.64	3.25	2.67	3.89	60.66	0.000	1>2.4>3
Cases	74	85	113	46			
%	23	27	36	14			

[a] Welch F-ratio.
[b] Pairs indicated with asterisk (*) are significant at the .10 level. all others at the .05 or better.

Table VI Comparison and validation of clusters

Cluster	1 Clan	2 Adho-cracy	3 Market	4 Hier-archy	ANOVA F-Stat[a]	Sig.	MCP Games-Howell[b]
Profit margin, %	8.56	4.73	3.90	6.82	4.08	0.008	1>4>3
Asset turnover	1.12	1.33	1.15	1.28	3.98	0.009	2>1,3
Personnel growth, %	0.67	3.92	3.63	0.34	1.39	0.248	
R&D expenditure of sales, %	1.90	4.55	3.37	1.00	12.42	0.000	2,3>1,4
Education Background diversity	0.69	0.67	0.64	0.60	4.26	0.006	1,2>4

[a] Welch F-ratio.
[b] Significant at the .05 level.

Fig. 1 Competing values framework (Adapted from Cameron and Lavine, 2006; Quinn and Rohrbaugh, 1983)
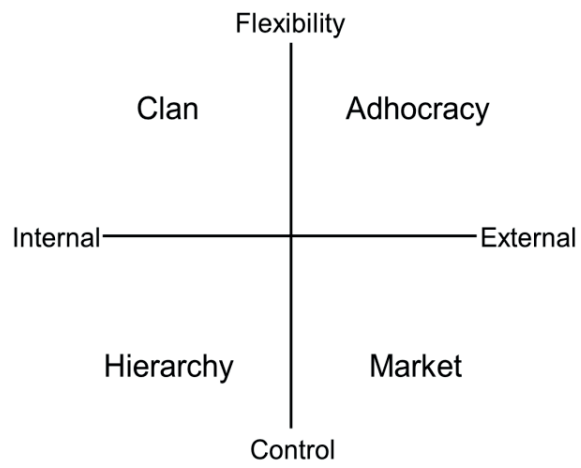
III

DOES BUSINESS STRATEGY AND MANAGEMENT
CONTROL SYSTEM FIT DETERMINE PERFORMANCE?

by

Tapio Jukka, 2023

Does business strategy and management control system fit determine performance?

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Abstract

Purpose – This study examines the relationship between business strategy, management control system (MCS) type and performance. Does the alignment of organisation business strategy and MCS fresult in better performance?

Design/methodology/approach – This study draws on the business strategy and MCS type literature to identify business strategies and MCS types. A scoring method was used to identify business strategy types and cluster analysis to identify MCS types from a sample of 80 firms and 621 firm-years of data. Analysis of variance was used analyse the differences.

Findings – Four types of MCS were identified and were labelled clan, adhocracy, market and hierarchy. The sample was split into defender, analyser, prospector and reactor strategies. The results showed defender strategies performed better with hierarchy or market type MCSs while prospector strategies performed better with clan or adhocracy MCS types. Analysers performed acceptably with all MCS types.

Practical implications – The results of this study suggest that organisations should align their business strategy with a certain MCS type to achieve good performance. Also, alignment of top management and business strategy is supported as the top management properties differ between the MCS types.

Originality/value – This research contributes to the management control and strategy literature by demonstrating how the alignment between organisation business strategy and organisation-level MCS type determines organisational performance. The results suggest that differing business strategies yield better performance when aligned with the appropriate management controls represented by an MCS type.

Keywords Management control system, Business strategy, Performance, Typology

Paper type Research paper

1. Introduction

While the relationship between business strategy and the use and design of management controls to implement it has received considerable attention, our knowledge on this relationship and its effects is still fragmented (Chenhall, 2003; Otley, 2016). Management controls are the processes and mechanisms managers use to influence the behaviour of individuals and groups towards the predetermined objectives and goals of the organisation. These controls can include personal supervision, performance measurement or reward systems, and these control processes and mechanisms are merged and used together as management control systems (MCSs). Depending on how control in an organisation is imposed by management, differing MCS types can be identified. The objectives and goals are derived from the organisation's long-term plans and strategies on how it will compete in its industry and adapt to its environment. However, successful implementation of differing strategies

requires different types of management controls and the fit between the strategy and MCS type may determine the organisation's performance (Chenhall, 2003; Kihn, 2010).

There are several definitions for strategy. Often, strategy is defined as a unified, comprehensive and integrated plan of action and patterns in a stream of actions and decisions that guide the organisation toward predefined goals and objectives (Mintzberg, 1996a). Strategic decisions take place on many levels in the organisation and concern different aspects of the organisations tasks. Corporate strategy considers the choices of what businesses to operate in, acquisition and divestment of businesses and how to finance and structure the organisation (Langfield-Smith, 1997). Business or competitive strategies deal with the organisation's business units and how these compete and position themselves in their respective markets (Langfield-Smith, 1997). Finally, operational strategies define how the different functions of the organisation contribute to the organisation's business strategy.

Management control systems are the collection of control processes and mechanisms management uses to reach their organisations predetermined objectives and goals (Malmi and Brown, 2008). Management selects the appropriate combination of these controls to fit their firm's contextual conditions. These control processes and mechanisms are not used separately; instead, they are combined and used together as management control systems (Malmi and Brown, 2008). There is substantial literature proposing various frameworks for MCSs (e.g. Bedford and Malmi, 2015; Ferreira and Otley, 2009; Malmi and Brown, 2008; Simons, 1995). These frameworks are aimed at the study of the individual parts and characteristics of a single MCS (Strauß and Zecher, 2013). Another stream of MCS literature seeks to identify MCS archetypes (e.g. Lebas and Weigenstein, 1986; Ouchi, 1979; Speklé, 2001; Whitley, 1999). These typologies allow to address control in its entirety on an organisational level instead of the level of individual controls and processes (Speklé, 2001).

There has been considerable interest in the relationship between business strategy, MCS and performance, and the literature can be classified into three streams. The first stream examines the effect of strategy on MCS and sees the MCS basically as a strategy implementation tool (Gani and Jermias, 2012). The MCS should be designed to support the business strategy to gain competitive advantage and superior performance (Langfield-Smith, 1997). The second stream of literature looks at the effect of the MCS on strategy and considers MCSs as systems management use to craft strategies (Gani and Jermias, 2012). The MCS plays a substantial role in the business strategy formulation and has continuous implication throughout the strategic management process (Henri, 2006a). The third stream of literature takes a contingency theory approach and asserts that some MCSs are more suited to certain business strategies than others, or in other words the organisations business strategy and MCS should be aligned (Chenhall, 2003; Gani and Jermias, 2012). Thus, strategy and MCS interact in a system where MCS facilitates crafting a business strategy and the MCS processes and mechanisms change to match the business strategy (Gani and Jermias, 2012; Kober et al., 2007).

Although the relationship between business strategy, MCS and performance has received interest in the management accounting and strategy literature, the results are still ambiguous (Chenhall, 2003; Langfield-Smith, 1997; Otley, 2016). These unclear results can be attributed to differing conceptualisations and operationalisations of business strategy and MCS. Although the limited number of generic business strategy typologies applied in the extant studies share similarities, comparing strategy constructs between them might prove problematic (Tucker et al., 2009). Also, as Langfield-Smith (1997) notes that often no difference between intended and realised strategies were made and the presence of certain management controls did not mean they were used. Otley (2016) suggests that the fragmented results are partly due to the varied dimensions of the control systems used in the studies. Tucker et al. (2009) found MCSs were operationalised using specific features of a MCS picked from an inventory of possible controls. Although there are many studies linking individual management controls with performance, the results are still equivocal and fragmented. A more consistent and coherent

view of the relationship between business strategy, MCS and performance can be achieved using archetypes to operationalise business strategy and MCS. Business strategies reveal how organisations as a whole adapt to changes in their environment (Miles and Snow, 1978). Similarly, an MCS archetype is a characteristic configuration of control structures and practices that allow to address control in its entirety at the organisational level instead at the level of individual controls and structures (Speklé, 2001).

To further our understanding of the relationship between business strategy, MCS and performance, this study examines the association of organisation-level business strategy and MCS type with performance. Using the Miles and Snow (1978) business strategy typology and an organisation-level MCS typology (Jukka and Pellinen, 2020; Ouchi, 1979; Speklé, 2001; Whitley, 1999) this study addresses the following research question: Does the alignment of organisation business strategy and MCS result in better performance? Or in other words, does a certain business strategy work better with a certain type MCS? This research contributes to the management control and strategy literature by demonstrating that the organisation-level MCS type should be aligned with the organisation's business strategy to enhance performance. A defender business strategy performs better with a hierarchy or market type MCS while a prospector business strategy performs better with a clan- or adhocracy-type MCS. The results also suggest that the MCS types reflect how management seeks to solve the administrative problem of the adaptive cycle and that certain MCS types are better suited than others to solve the entrepreneurial or the engineering problems. As a third contribution, this study demonstrates the use of archival accounting and TMT data as proxies for organisation-level MCS archetypes and business strategies to study the MCS – business strategy link.

The paper proceeds as follows. First, the relevant literature on business strategy and MCS types are reviewed and hypotheses drawn. Then the data and methods are described followed by the results. Finally, the theoretical and managerial implications of the study are discussed.

2. Literature review
2.1 Business strategy
Business strategies explain how firms compete in their respective market environments and seek to achieve superior performance. Management literature has proposed several business strategy typologies. Miles and Snow (1978) categorise business strategies as defender, analyser, prospector or reactor while Porter (1980) categorises them in terms of differentiation, cost leadership, focus or stuck in the middle. March (1991) separates business strategies based on exploration and exploitation. Treacy and Wiersema (1995) suggest business strategies based on operational excellence, customer intimacy or product leadership. Although the names of the strategies differ between the typologies, they share common attributes. The defender strategy of Miles and Snow (1978) is similar to Porter's (1980) cost leadership, March's (1991) exploitation and Treacy and Wiersema's (1995) operational excellence while the prospector strategy of Miles and Snow (1978) aligns with Porter's (1980) differentiation, March's (1991) exploration and Treacy and Wiersema's (1995) product leadership (Bentley et al., 2013).

Miles and Snow (1978) propose four business strategies. The three viable strategies form a strategy continuum with defenders and prospectors at the opposing ends and analysers between these two. The fourth strategy, reactors, is an unstable failed strategy. There are two reasons for choosing this business strategy typology. First, the business strategy continuum enables the operationalisation of strategy as a continuous measure derived from archival data while the other typologies require personal interviews and surveys of informants (Bentley et al., 2013; Ittner et al., 1997). Second, while the other typologies define strategies as discrete alternatives (March, 1991; Porter, 1980; Treacy and Wiersema, 1995), there are similarities between the business strategies of the different typologies allowing the generalisation of the results to the business strategies of alternative theories.

Miles and Snow (1978) define defenders as firms with narrow product-market domains and focused on efficiency. The narrow and stable markets are aggressively maintained with competitive pricing and excellent customer service. Developments outside the domain are largely ignored and research and development focus on improving existing goods and services. Growth is modest but steady through market penetration. Technological efficiency is central to defenders resulting in heavy investment and continuous improvements in the core technology. Financial and production expertise prevail in the top management of these firms and their tenures are long with promotions from within. Organisational structures reflect centralised control with functional structure and division of labour.

Prospectors are firms that continuously search for market opportunities (Miles and Snow, 1978). These firms attend to a broad and developing domain and continuously monitor the environmental conditions and events. Growth is fast and can happen in spurts induced by product and market development. These firms avoid long-term commitment to a single technology by applying multiple flexible technologies and investing in people. Top management is numerous consisting often of marketing and R&D expertise. Their tenures are short, and managers may be hired from outside. Control is decentralised and organisations display product structures and low division of labour.

Miles and Snow (1978) define analysers as firms that operate in two product-market domains and try to balance these two often-conflicting domains. Analysers combine defender and prospector characteristics to form their unique strengths and weaknesses. Analysers seek new market and product opportunities while maintaining a solid base of their traditional goods and services. Stable growth is accomplished with market penetration and product-market development. These firms exhibit both stable, efficient technology and flexible technologies. The top management consists of marketing, applied research and production expertise. Control is moderately centralised with complex matrix organisational structures.

In addition to the three viable strategies, Miles and Snow (1978) also introduce an unsuccessful strategy, the reactor. It is an unstable and inconsistent organisation that fails to adapt to the changing environment. This is often a result of management's failure to present a viable business strategy, the organisation's technology, structure and process are not suited to the organisation strategy, or management maintains to a strategy-structure relationship which is no longer relevant. Due to their ambiguous nature and inconsistent behaviour, reactors are often omitted from studies and only the viable strategies are considered (Blackmore and Nesbitt, 2013). Omission to identify the reactors and categorise them within the viable firms can distort the strategy-performance link as reactors are considered unviable or unprofitable (Hambrick, 1983; Miles and Snow, 1978).

2.2 MCS typologies

The extant management and accounting literature have generated several MCS typologies. In their review, Strauß and Zecher (2013) identified four typologies suited to typing and differentiating whole organisation-level MCSs. Ouchi (1979) uses a transaction cost economics (TCE) approach to classify organisational evaluation and control systems into market, bureaucracy and clan mechanisms. Similarly, using the TCE approach Lebas and Weigenstein (1986) also identify the three types of MCSs, but use different names: market, rules and culture approaches (Strauß and Zecher, 2013). In the market types, external market mechanisms are used to control behaviour. Externally set rules and output controls are used in the bureaucracy and rules types, while rituals, internalised beliefs and values are used to influence behaviour in the clan and culture types.

Whitley (1999) suggests a typology of four different control systems based on the comparative sociology approach. His output-based control systems align with the market types of the earlier typologies (Lebas and Weigenstein, 1986; Ouchi, 1979). Whitley's bureaucratic

control systems are similar to bureaucracy and rules, while patriarchal control systems resemble clan and culture types in Ouchi's (1979) or Lebas and Weigenstein's (1986) typologies. The fourth control system in Whitley's MCS typology is delegated control systems, where autonomous groups or units in the organisation apply control.

Speklé (2001) returns to the TCE approach and introduces a five control type MCS typology. Four of his control types correspond to the types in the earlier typologies. Speklé's (2001) market and machine controls align with the market and bureaucracy types while his boundary control based on interdicts and limitations aligns with clan, culture and patriarchal controls in the earlier typologies. His exploratory control relies on information sharing and the emergence of insights to achieve control and is similar to Whitley's (1999) delegated control systems. Speklé (2001) introduces arm's length control, which incorporates elements of the competitive market and administrative machine controls and does not have an equivalent in the earlier typologies.

Viewing organisations from an effectiveness perspective, Quinn and Rohrbaugh (1983) used organisational effectiveness measures applied in organisation analysis to differentiate organisation types. Their competing values framework (CVF) consists of three value dimensions (control-flexibility, internal-external and means-ends) that explain conceptualisations of organisational effectiveness. The two main dimensions form four quadrants differentiating organisational structure with values of control and stability to flexibility and individuality and organisational focus from an internal view on the people in the organisation to an external view on the organisation itself. The four quadrants represent differing organisation types identified as clan, adhocracy, market and hierarchy, and each type has distinctive organisational effectiveness criteria or measures. The CVF enables the identification of distinct organisational effectiveness and performance measures for each quadrant or organisation type that reflect the associated values and applied management controls of that organisation type (Cooper and Quinn, 1993).

The four organisation models in the CVF are comparable with the reviewed MCS types (Jukka and Pellinen, 2020). The clan, market and hierarchy types in the CVF have directly matching MCS types (Büschgens *et al.*, 2013; Yu and Wu, 2009). The human relations approach of the clan type coincides with the clan, culture, patriarchal and boundary MCS types. Correspondingly, the rational goal-oriented approach of the market type matches the market and output-based MCS types and the hierarchy corresponds with the bureaucracy, rules and machine types. The open systems adhocracy type matches the delegated and exploratory control types of Whitley (1999) and Speklé (2001) with emerging insights and autonomy central in accomplishing control.

Quinn and Rohrbaugh (1983) use the applied organisational effectiveness measures to differentiate the organisation types. Thus, each CVF and MCS type has distinctive performance criteria or measures associated with it and these can be utilised to differentiate them. The subsequent CVF literature has identified an array of organisation properties and effectiveness measures characteristic for each organisation type (e.g. Cooper and Quinn, 1993; Hartnell *et al.*, 2011; O'Neill and Quinn, 1993; Zammuto and O'Connor, 1992). Given that each organisation type has characteristic and identifiable effectiveness criteria and measures, the organisation and MCS types can be identified from these effectiveness criteria and measures. Jukka and Pellinen (2020) suggested top management team (TMT) size, firm size, TMT output functional background, TMT throughput functional background, TMT peripheral functional background, TMT general management background, TMT age, firm tenure and team tenure as measures that can be used to group firms with similar organisation-level MCS types.

Although increasing TMT size has been shown to improve firm performance, it has also been linked with increasing communication and coordination problems (Certo *et al.*, 2006; Haleblian and Finkelstein, 1993). Thus, adhocracy control pursuing agility should exhibit small TMTs able to make quick decisions, while hierarchy control underscoring stability

would exhibit large TMTs (Cameron and Lavine, 2006; Quinn and Rohrbaugh, 1983). Similarly, firm size separates adhocracy and hierarchy control as small firms are more adaptive and ready to change than larger more bureaucratic firms (Abebe, 2010; Baliga and Jaeger, 1984).

The upper echelons theory (Hambrick and Mason, 1984) asserts the decisions and actions of TMTs are linked with their functional backgrounds classified as output, throughput and peripheral functional backgrounds. Output functions include marketing, sales and R&D emphasising growth and search for new opportunities and markets (Abebe, 2010; Hambrick and Mason, 1984). Thus, adhocracy and market control should have higher share of output functional backgrounds as the CVF suggests adhocracies value growth and market organisations value search for new opportunities and markets (Hartnell *et al.*, 2011; Zammuto and O'Connor, 1992). Production, process engineering and accounting are considered throughput functional backgrounds and they strive to improve the transformation process (Abebe, 2010; Hambrick and Mason, 1984). The CVF suggests that clan control applies to process-oriented leadership, while adhocracy control applies to improvement-oriented leadership (O'Neill and Quinn, 1993; Wang *et al.*, 2015), making throughput functional backgrounds more common with these control types.

TMT members who are not directly involved with the organisation's core activities (e.g. law, finance, personnel and administrative backgrounds) are considered as peripheral functional backgrounds (Hambrick and Mason, 1984). A higher share of peripheral backgrounds would benefit clan control, where teamwork, participation and human resource development are valued (Hartnell *et al.*, 2011). Also, peripheral functional backgrounds are valuable in formal planning, coordination and maintaining structures important to hierarchy and goal-oriented market control (Hambrick and Mason, 1984; O'Neill and Quinn, 1993).

Not all top executives hold a functional background (Jukka and Pellinen, 2020; Koch *et al.*, 2017). Instead, they have general management backgrounds and possess generic governance expertise from long tenures in large firms (Biemann and Wolf, 2009; Koch *et al.*, 2017). Thus, general management backgrounds are more prominent within hierarchy and market controls, as they emphasise control.

The upper echelons theory notion linking TMT age, organisation tenure and team tenure with performance has received considerable support (Bell *et al.*, 2011; Hambrick, 2007; Sturman, 2003). Younger TMTs have been found to be more open to strategic change and take risks while older TMTs become inflexible and avoid risky decisions (Wiersema and Bantel, 1992). Within the CVF, adhocracies have been characterised as agile and risk-taking while hierarchies are cautious and value stability (Hartnell *et al.*, 2011; Zammuto and O'Connor, 1992). Thus, adhocracy control should have younger TMTs and hierarchy control older TMTs.

Long organisation tenure has been shown to increase the TMTs resistance to change and preserve organisational status quo (Boeker, 1997). Long tenures should be common with hierarchy control as it attempts to maintain existing structures (O'Neill and Quinn, 1993). In turn, long organisation tenure is a prerequisite for clan control (Baliga and Jaeger, 1984). On the other hand, long organisation tenures can adversely affect the agility of adhocracy control and the environmental scanning of market control (Abebe, 2010; Hartnell *et al.*, 2011). This suggests TMTs of clan and hierarchy organisations display longer organisation tenures than TMTs of adhocracies and market organisations.

Although TMTs might not function as real teams, they have been found to integrate their behaviour with increasing team tenure (Hambrick, 2007). Clan control encourages teamwork, personnel development and empowerment and would benefit from more team-like behaviour (Hartnell *et al.*, 2011). In contrast, market control cold exhibit short-team tenures as it stresses achievement or short-term results and control is based on agreed outputs (Hartnell *et al.*, 2011; Ouchi, 1979).

2.3 Hypotheses development
Miles and Snow (1978) suggest three viable strategies management can pursue by designing and implementing the appropriate organisation and controls to be effective and competitive. Consequently, the strategy-performance link has received substantial interest in the strategic management research and numerous studies have found support for equal performance and effectiveness of the viable business strategies (Blackmore and Nesbitt, 2013; Conant *et al.*, 1990; Woodside *et al.*, 1999). There is also evidence of differing performance between the viable strategies (Hambrick, 1983; Parnell and Wright, 1993; Snow and Hrebiniak, 1980). Zahra and Pearce (1990) indicate firm size, environmental attributes and fit between strategy type and implementation confound the strategy-performance link. Also, Miles and Snow (1978) point out the increased cost to analysers operating in two domains compared to pure defenders or prospectors operating in a single domain.

Successful organisations continually monitor their environment and adapt to the detected changes. Miles and Snow (1978) separate this continuous process or adaptive cycle into three major problems management must solve: entrepreneurial, engineering and administrative problems. The entrepreneurial problem focuses on the definition of the organisation's product-market domain, the engineering problem solves the choice of technologies and processes and the administrative problem creates and maintains a system of organisational structure and control (Conant *et al.*, 1990). Defender type organisations concentrate on the engineering tasks when striving for efficiency, while prospector organisations commit more resources to the entrepreneurial tasks of monitoring markets and trends (Conant *et al.*, 1990). Analysers due to their dual nature are more balanced. Therefore, all three strategies have differing administrative problems and their solutions.

How the organisation solves the administrative problem is crucial for firm performance. The administrative problem involves the selection, justification and development of the organisation structure and processes when attempting to coordinate and implement its strategies (Conant *et al.*, 1990; Shortell and Zajac, 1990). Management controls are the processes and mechanisms managers use to influence the behaviour of individuals and groups towards the objectives and goals (Flamholtz *et al.*, 1985). These control processes and mechanisms are not used in isolation; instead, they are combined and used together as management control systems (Malmi and Brown, 2008). The four MCS types identified in Section 2.2 represent different approaches to how organisations solve the administrative problem.

According to Miles and Snow (1978, p. 48), the administrative problem of defenders is "how to maintain strict control of the organization in order to ensure efficiency". Organisations utilising management controls focusing on control and stability would be more efficient and show better performance. Both hierarchy and market MCS types emphasise stability and control, while hierarchies underscore an internal view of the organisation and markets an external view (Quinn and Rohrbaugh, 1983). Therefore, a hierarchy or market MCS would be better for an organisation following a defender strategy. The following hypothesis can be stated:

H1. A defender strategy performs better with hierarchy or market MCS types than clan or adhocracy MCS types.

The administrative problem of prospectors is "how to facilitate and coordinate numerous and diverse operations" (Miles and Snow, 1978, p. 66). Prospectors strive to constantly add and change their products and services calling for innovation and flexibility (Shortell and Zajac, 1990). Clan and adhocracy MCS types value flexibility and individuality in their structure while clan has an internal and adhocracy an external view (Quinn and Rohrbaugh, 1983). This suggests a clan or adhocracy MCS would be better for an organisation following a prospector strategy. A second hypothesis can be stated:

H2. A prospector strategy performs better with clan or adhocracy MCS types than hierarchy or market MCS types.

Analysers try to balance the two domains they operate in. In the stable product-market domain they seek efficiency while in the turbulent product-market domain they innovate and seek new opportunities (Shortell and Zajac, 1990). Their administrative problem is to differentiate and integrate the organisations structure and processes between the two domains (Miles and Snow, 1978). Therefore, analysers would use management controls that signal control and stability in the stable domain and flexibility and individuality in the turbulent domain. In this light, analysers can apply various MCS types with acceptable performance. This leads to the third hypothesis:

H3. An analyser strategy can perform equally well with all MCS types.

Return on assets (ROA) is a commonly used measure of organisation performance (Kihn, 2010). ROA measures how successfully the firm has utilised its assets to generate profits (net profit plus interest and finance costs) irrespective of the financing of those assets, whether it is equity or debt (Selling and Stickney, 1989). Thus, ROA can also be applied to various types of organisations in different industries as all organisations strive to acquire a share of the limited amount of capital in society (Kihn, 2010; Selling and Stickney, 1989).

3. Research methodology
3.1 Data
The sample was obtained from firms listed in the NASDAQ OMX Helsinki stock exchange during 2008–2015 including firms in the basic materials, consumer goods, consumer services, industrials and technology industries. Financials, health care, utilities and oil and gas industries were omitted as their financial structure or business differs markedly from the sample. Two firm were omitted as outliers based on Euclidian distance (Hair *et al.*, 2015) and eight firms were omitted due to missing data leaving 80 firms with 621 firm-years of data. After calculation of the strategy construct and the four organisation-level MCS types, the sample consisted of 391 firm-years of data. Demographic data for the sample is presented in Table 1.

The financial data used in this study was obtained from the Voitto + company information database published by Asiakastieto Group and the firms' annual reports. Information on the TMTs was obtained from the published and audited annual reports of the firms. Additional information was obtained from stock exchange releases, firm Internet pages and TMT member LinkedIn profiles. The TMT was defined as the team the firm reported in their annual report. It was thus conceptualised as a real team identified by itself and outsiders as a team (Senior and Swailes, 2004).

3.2 Methods and measures
Following Jukka and Pellinen (2020), TMT size, firm size, functional backgrounds, age, firm tenure and TMT team tenure were used to cluster the sample and differentiate the four organisation-level MCS types. First, hierarchical cluster analysis applying squared Euclidian distance as similarity measure and Ward's method as clustering algorithm was used to produce a full set of cluster solutions. Increase in heterogeneity measured as the agglomeration coefficient was used to determine the number of clusters (Hair *et al.*, 2015). The cluster solution was further optimised using non-hierarchical K-means clustering as it allows the reassignment of cases to other clusters while minimising heterogeneity (Hair *et al.*, 2015). To avoid variables with large ranges getting more weight in defining the cluster solution and dominating the result, the variables were standardised using Z-scores (Ketchen and Shook, 1996).

	n
Panel A: Industry classification	
Basic materials	7
Consumer goods	13
Consumer services	11
Industrials	35
Technology	14
Total	80
Panel B: Firm size (personnel)	
0–250	5
251–500	11
501–1,000	15
1,001–5,000	28
5,001–10,000	6
10,001	15
Total	80

Table 1.
Demographic data of
sample

TMT size was the number of persons in the team. Firm size was measured as the mean number of employees during a fiscal year.

The functional background variables were calculated as the share of managers with the corresponding background in the TMT. Consistent with prior studies (Abebe, 2010; Hambrick and Mason, 1984), TMT functional backgrounds were categorised as output, throughput and peripheral functions. Output functions include marketing, sales and R&D. They emphasise growth and search for new opportunities and markets. Throughput functions seek to improve the efficiency of the transformation process and include production, process engineering and accounting. Peripheral functions (e.g. law, personnel, finance) are not directly involved with the firm's core activities. A fourth category, general management, was added as not all managers have specific functional backgrounds, but instead have broader general management backgrounds (e.g. division heads; Biemann and Wolf, 2009).

TMT age, firm tenure and team tenure were measured as simple averages of team member age and tenures for each fiscal year.

Prior to determining the viable business strategies, the reactor strategies were identified from the sample. A reactor strategy is unviable and unprofitable (Hambrick, 1983; Miles and Snow, 1978) resulting in low or negative ROA. Firms with two negative ROA values during a three-year period were deemed reactors during this period. These cases were omitted when ranking the viable strategies. A single negative ROA value was considered a chance and seen as a viable strategy case.

The viable business strategy of the firms was measured with a composite strategy measure based on variables from prior studies (Bentley *et al.*, 2013; Ittner *et al.*, 1997) that reflect different aspects of the underlying business strategy with high values representing firms following prospector strategies, low values defender strategies and analysers between them. Similar to Bentley *et al.* (2013), the following variables were used in the strategy construct: (1) the ratio of research and development to sales, (2) growth of sales, (3) the ratio of employees to sales, (4) the ratio of sales to operating costs, (5) variation in number of employees and (6) the ratio of net property, plant and equipment (NPPE) to total assets.

The ratio of research and development to sales is an indicator for the firms tendency to seek new products (Ittner *et al.*, 1997; Thomas and Ramaswamy, 1996). Prospectors are

involved in more innovative activities inducing higher expenditure in research and development. Growth of sales proxies the firm's growth and investment opportunities with prospectors expected to show higher growth than defenders (Bentley *et al.*, 2013; Ittner *et al.*, 1997). The ratio of employees to sales measures the firm's ability to produce and distribute goods efficiently. As defender strategies focus on efficiency, defenders are expected to have fewer employees than prospectors (Ittner *et al.*, 1997; Thomas and Ramaswamy, 1996). Bentley *et al.* (2013) used the ratio of selling, general and administrative expenses (SG&A) to sales as indicator for marketing. Due to unavailability of SG&A, this was substituted with the ratio of sales to operating costs as firms following prospector strategies can command higher prices (Balsam *et al.*, 2011). Organisational stability concerning the length of employee tenure and turnover is proxied by the variation in number of employees (Bentley *et al.*, 2013; Higgins *et al.*, 2015). Prospectors tend to have shorter tenures and higher turnover leading to higher variation (Higgins *et al.*, 2015). Bentley *et al.* (2013) measured variation as standard deviation, but this was replaced with the coefficient of variation to make comparison of small and large firms possible (Cramer and Howitt, 2004). The ratio of NPPE to total assets measures the capital intensity and focus on production assets with defenders expected to score higher (Bentley *et al.*, 2013; Higgins *et al.*, 2015).

Following earlier studies (Bentley *et al.*, 2013; Ittner *et al.*, 1997) the variables were averaged over a four-year rolling period (the firm-year and three prior years). To construct the strategy measure, within each industry class, each of the six variables were sorted in descending order and ranked by forming quintiles giving firms in the highest quintile a score of 5, the second highest a score of 4 and so on. Firms in the lowest quintile received a 1. The scoring was inverted for the NPPE to total assets ratio as defenders were expected to get higher results. Then for each firm the ranking scores were summed across the six variables giving a maximum score of 30 and a minimum score of 6. Finally, firms with scores 6–13 were considered defenders, 14–22 analysers and 23–30 prospectors (Bentley *et al.*, 2013).

Firm performance was measured as ROA. It was calculated as how much the business generated profit for the average assets during the financial year. Profit was net profit plus interest and finance costs. Average assets were the average of balance sheet total for the current and previous years.

4. Results

The means, standard deviations and correlations for the sample are shown in Table 2. The correlation matrix shows conceivable associations between the variables and the highest correlation was −0.64. The pairwise correlations were below the generally accepted limit of 0.70, indicating there were no concerns with multicollinearity (Hair *et al.*, 2015).

Using a combination of hierarchical and non-hierarchical clustering methods the sample was separated into groups representing differing organisation-level MCS types (Jukka and Pellinen, 2020). Cluster analysis is commonly used to group similar objects into clusters, which differ from objects in the other clusters (Hair *et al.*, 2015). First, hierarchical cluster analysis was used to create a full set of cluster solutions. Increase in heterogeneity measured by the agglomeration coefficient (Hair *et al.*, 2015) supported a four-cluster solution and this was further optimised using non-hierarchical *K*-means clustering which reassigns observations into other clusters in order to minimise heterogeneity (Hair *et al.*, 2015). Software generated seed points were used to create a four-cluster solution with 136, 158, 100 and 227 cases in the clusters, see Table 3. Different seed points for the *K*-means clustering were used to test the robustness and validity of the solution. As a result, 92.2% of the cases were grouped in the correct cluster suggesting a very stable solution (Hair *et al.*, 2015).

The four clusters in the cluster solution were interpreted based on the clustering variables. Jukka and Pellinen (2020) suggested the identified four clusters proxied the underlying MCS

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. TMT size, persons	7.30	2.39	1															
2. Firm size, persons	4,781	6,576	0.24	1														
3. Output functional background, %	22.11	18.08	0.03	−0.37	1													
4. Throughput functional background, %	25.78	15.73	−0.32	−0.19	−0.01	1												
5. Peripheral functional background, %	16.52	13.49	0.22	0.20	−0.34	−0.36	1											
6. General management background, %	35.59	20.64	0.07	0.34	−0.64	−0.51	−0.08	1										
7. TMT age, years	48.18	3.36	0.01	0.27	−0.19	−0.11	0.12	0.17	1									
8. Firm tenure, years	9.05	4.34	0.15	0.35	−0.12	0.00	0.10	0.04	0.41	1								
9. Team tenure, years	4.16	2.31	−0.06	−0.09	0.01	0.15	0.06	−0.16	0.30	0.56	1							
10 R&D to sales, %	2.82	5.24	−0.03	−0.21	0.37	−0.06	−0.20	−0.15	−0.26	−0.24	−0.16	1						
11. Growth of sales, %	2.42	23.03	0.01	−0.03	0.12	−0.09	0.01	−0.04	−0.05	−0.04	0.01	0.02	1					
12. Employees to sales, persons/M€	6.20	3.63	−0.22	−0.15	0.08	0.19	−0.18	−0.10	−0.26	−0.30	−0.20	0.28	0.04	1				
13. Sales to operating costs	1.12	0.18	0.21	0.10	0.04	−0.06	0.05	−0.02	0.00	0.05	0.07	0.02	0.11	−0.14	1			
14. Variation in personnel	0.10	0.11	−0.13	−0.09	0.08	0.00	−0.09	−0.02	−0.10	−0.18	−0.27	0.08	0.13	0.24	−0.13	1		
15. NPPE to assets, %	23.76	19.57	0.10	0.10	−0.02	−0.02	0.17	−0.08	0.16	0.20	0.06	−0.38	−0.05	−0.31	0.14	−0.17	1	
16. ROA, %	6.09	9.57	0.14	0.02	0.03	−0.03	0.01	0.00	−0.05	0.14	0.20	0.03	0.27	−0.19	0.42	−0.19	−0.06	1

Note(s): All correlation above $r = 0.08$ significant at the $p < 0.05$

Table 2.
Descriptive statistics
and Pearson
correlations ($n = 621$)

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Do strategy
and MCS
determine
performance

Cluster	1 Clan	2 Adhocracy	3 Market	4 Hierarchy
TMT size, persons	7.54	6.84	5.11	8.44
Firm size, persons	3,372	1,419	1,319	9,495
Output functional background, %	26.83	38.43	14.6	11.21
Throughput functional background, %	28.7	24.76	45.75	15.83
Peripheral functional background, %	22.23	12.68	5.51	20.65
General management background, %	22.22	24.13	34.14	52.27
TMT age, years	49.56	45.58	47.95	49.26
Firm tenure, years	12.87	5.67	7.62	9.75
Team tenure, years	7.06	2.84	3.93	3.42
Cases	136	158	100	227
%	21.9	25.4	16.1	36.6

Table 3.
Results of the *K*-means clustering (*n* = 621)

types in place. The first cluster identified as clan MCS type was characterised by a large TMT with diverse functional backgrounds suggesting a tendency towards teamwork, participation and human resource development (Hartnell *et al.*, 2011). Also, long firm and team tenures found in this cluster have been noted to promote clan control (Baliga and Jaeger, 1984).

Firms in the second cluster were characterised as using adhocracy type control. The small organisations and TMTs suggested flat, adaptive organisation structures that are flexible and adaptive to environmental changes (Villalba, 2006). A large part of the TMT had output functional backgrounds suggesting increased environmental scanning and searching for growth opportunities (Cho, 2006). Managers with peripheral functional backgrounds were low in this cluster. They are not involved with the firm's core activities and may not enhance adaptability, creativity and agility of these organisations (Hartnell *et al.*, 2011). The young and short-tenured TMTs also supported a view of agility and innovation seeing that increasing age promotes risk avoidance (Wiersema and Bantel, 1992) and long-tenure inflexibility and less environmental scanning (Abebe, 2010).

The third cluster of firms were characterised by a small organisation and small TMT with a large share of managers with general management backgrounds suggesting these firms rely on competent governance from experienced managers (Biemann and Wolf, 2009). The short firm and team tenures of TMTs denoted a willingness to change or initiate new strategies (Wiersema and Bantel, 1992). These are characteristic for a directive and goal-oriented leadership exerting market type control (Hartnell *et al.*, 2011; Zammuto and O'Connor, 1992). Goal-oriented market type control also benefits from the high share of top managers with throughput functional backgrounds, i.e. production, process engineering and accounting, as efficiency and productivity are pursued (Hartnell *et al.*, 2011; Quinn and Rohrbaugh, 1983).

Firms in the fourth cluster were large and had the largest TMTs. Large organisations become more bureaucratic and hierarchical as their size increases inducing hierarchical controls within the organisation (Baliga and Jaeger, 1984; Mintzberg, 1996b). The TMTs had the highest share of managers with general management backgrounds and long firm tenures. These managers have ascended within the organisation in general management positions gaining the experience needed to control and coordinate large organisations (Biemann and Wolf, 2009). The lack of outward scanning managers with output functional backgrounds suggested emphasis on internal control and coordination in hierarchical type of control.

Table 4 provides descriptive statistics for the strategy construct and its raw components. In the first step, 65 (16.6%) reactor cases were identified. Next, the viable business strategies were identified using the composite strategy measure. Consistent with expectations, firms

following defender, analyser and prospector strategies had significantly different ($p < 0.05$) means in the composite strategy measure and all its six components. Although, all these strategies are viable (Miles and Snow, 1978) the share of defenders and prospectors was only 13 and 12% respectively while analysers made up 75%. Earlier research (Bentley *et al.*, 2013; Higgins *et al.*, 2015; Lim *et al.*, 2018) have reported 5–8% of defenders and prospectors. The difference was mostly due to the use of the coefficient of variation as a measure for variation in personnel in this study. In unreported analysis when using standard deviation as a measure for variation in personnel the share of defenders and prospectors fell to 8% being comparable with earlier research. Standard deviation was highly correlated with the mean biasing the results and supporting use of the coefficient of variation.

One-way analysis of variance (*ANOVA*) was conducted to explore the impact of MCS type on effectiveness of different business strategies. To test the hypotheses the mean ROA was calculated for each MCS type for the different business strategies and compared using planned contrasts and post hoc multiple comparison procedures (MCP) (Belhekar, 2016; Howell, 2008). Levene's test revealed ($p < 0.01$) the group variances were unequal and group sizes differed for the analysers, mean of the viable strategies and reactors, making the Welch *F*-statistic and the Games-Howell post hoc test appropriate choices (Howell, 2008). The groups in defender and prospector strategies did not differ significantly and were analysed using the omnibus *F*-statistic. Table 5 shows the results of the analysis used to compare the means.

The first hypothesis suggested a defender strategy performs better with hierarchy or market MCS types than clan or adhocracy MCS types. There was a significant difference in ROA for the four MCS types ($F (3, 39) = 2.45, p = 0.078$). The planned contrasts test showed ROA was significantly ($p = 0.087$) higher for hierarchy ($M = 4.60, SD = 3.19$) and market MCS types ($M = 8.89, SD = 5.56$) than for clan ($M = 3.90, SD = 4.58$) and adhocracy MCS types ($M = 3,59, SD = 4.15$. These results support hypothesis 1.

The second hypothesis stated that a prospector strategy performs better with clan or adhocracy MCS types than hierarchy or market MCS types. The *ANOVA* detected a significant difference in ROA between the four MCS types ($F (3, 36) = 3.18, p = 0.036$). The planned contrasts test indicated a significantly ($p = 0.021$) higher ROA for clan ($M = 17.84, SD = 4.36$) and adhocracy MCS types ($M = 13.95, SD = 13.45$) than market ($M = 9.31, SD = 4.60$) and hierarchy types ($M = 5.48, SD = 3.56$). Hypothesis 2 is thus supported.

The third hypothesis suggested an analyser strategy can perform equally well with all MCS types. The results showed all MCS types achieved positive ROA for analyser strategies. The *ANOVA* indicated a significant difference between the MCS types ($F (3, 100.81) = 3.63, p = 0.016$), but post hoc analysis revealed only a significant difference between clan ($M = 10.87, SD = 8.47$) and hierarchy ($M = 6.93, SD = 4.15$) MCS types. Adhocracy and market MCS types did not differ significantly from the other MCS types. Thus, with only one significant difference, hypothesis 3 is partly supported.

	Total	Defender	Analyser	Prospector	Reactor
Strategy construct	15.01	11.91	18.07	24.15	
R&D to sales, %	2.78	0.51	2.71	6.03	2.53
Growth of sales, %	3.38	0.62	3.59	16.02	−3.34
Employees to sales, persons/M€	6.03	4.13	5.64	8.27	7.33
Sales to operating costs	1.11	1.09	1.13	1.14	1.01
Variation in personnel	0.12	0.06	0.10	0.23	0.18
NPPE to assets, %	0.23	0.38	0.21	0.12	0.25
ROA, %	5.75	5.10	8.26	11.03	−6.46
Cases	391	43	243	40	65
%		11.0	62.1	10.2	16.6

Table 4.
Descriptive statistics of the strategy construct ($n = 391$)

Panel A: Number of cases

	MCS type				
Strategy	Clan	Adhocracy	Market	Hierarchy	Total
Defender	14	3	8	18	43
Analyser	58	54	41	90	243
Prospector	6	15	4	15	40
Reactor	13	26	10	16	65
Total	91	98	63	139	391

Panel B: ROA

	MCS type				ANOVA			Planned	MCP Games-
Strategy	Clan	Adhocracy	Market	Hierarchy	Mean	F-Stat	Sig	contrasts[b]	Howell[b]
Defender	3.90	3.59	8.89	4.60	5.10	2.45	0.078	M, H > C, A *	
Analyser	10.87	7.94	7.91	6.93	8.26	3.63[a]	0.016		C > H ***
Prospector	17.84	13.95	9.31	5.84	11.03	3.18	0.036	C, A > M, H **	
Mean (D+A+P)	10.16	9.01	8.17	6.46	8.19	5.78[a]	0.001		C > H ***
Reactor	−4.03	−9.29	−10.17	−1.50	−6.46	3.40[a]	0.032		H > A *

Note(s): [a] Welch F-ratio, [b] *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table 5.
Effect of MCS type and
strategy on ROA

5. Discussion

Management control systems are the collection of control processes and mechanisms management uses to reach their organisation's predetermined objectives and goals. The objectives and goals are a result of the organisations strategy and prior literature suggests strategy and MCS should be aligned to reach optimal performance. To further our understanding of the relationship between business strategy, MCS and performance, this study examined the alignment of business strategy with organisation-level MCS types and its effect on performance.

This study set out with the aim of assessing if a certain type MCS works better with a particular business strategy. Miles and Snow (1978) suggest three viable strategies that should all be equally effective if implemented successfully. The results of this study showed a defender business strategy brought about better performance when using hierarchy or market type MCS compared to using clan or adhocracy types. Similarly, the use of clan or adhocracy type MCS produced better performance than market or hierarchy type MCS when pursuing a prospector business strategy. These results suggest a defender business strategy performs better when applying a control oriented MCS type and a prospector business strategy performs better when applying a flexibility oriented MCS type. Supporting these findings, the CVF also links control, stability and efficiency with market and hierarchy control and development, flexibility and adaption with clan and adhocracy control (Quinn and Rohrbaugh, 1983). Similarly, Henri (2006b) also found managers used management controls differently at the opposing ends of the CVF flexibility-control continuum. He found firms displaying flexibility values used more interactive controls and performance measures to achieve more interaction and communication, whereas firms displaying control values used fewer interactive controls and measures and tight control of operations. These results suggest that for a strategy to be viable it should be aligned with a certain type of MCS, where the controls match the requirements of the business strategy. The mismatch of MCS type and business strategy may explain the differences in performance between the viable strategies in prior research (Hambrick, 1983; Parnell and Wright, 1993; Snow and Hrebiniak, 1980; Zahra and Pearce, 1990).

It was also hypothesised that an analyser business strategy can perform well with all MCS types. The results showed that all MCS types were effective with an analyser strategy

producing a positive ROA. The results suggest that analysers can use varied types of management controls to reach an acceptable result when balancing their stable and turbulent product-market domains. Also, the intensity of the distinct management controls within each MCS type presumably adjust depending on how management attempts this balancing. Prior studies have noted firms apply and benefit from different management practices and accounting techniques when pursuing low cost or differentiation strategies (Chenhall and Langfield-Smith, 1998). It could also be possible that analysers combine different MCS types to be used in the different product-market domains (Zahra and Pearce, 1990). Unfortunately, the results of this study do not shed light on the possible combination of MCS types as the sample was split into four distinct groups.

The results also provide insight into the administrative problem of the adaptive cycle facing management continuously. Prior research suggests that defender type organisations focus on the engineering problems of the adaptive cycle when striving for efficiency and good performance, while prospector organisations focus on the entrepreneurial problems of monitoring markets and trends (Conant et al., 1990). In this light, the results suggest that the different MCS types are not all suitable for solving both the engineering and the entrepreneurial problems. Market and hierarchy MCS types are more suited to tackle the engineering problems while clan and adhocracy MCS types fair better with the entrepreneurial problems.

This research contributes to the management control and strategy literature in several ways. First, the results suggest the organisation-level MCS type, or how control is addressed in its entirety at the organisational level, should be aligned with the organisation's business strategy to reach the organisation's predetermined objectives and goals. The need for aligning the MCS type and business strategy is more pronounced when pursuing defender or prospector strategies, while the choice of MCS type seems to be less critical with analysers operating in two product-market domains. Second, the results also provide new insights of the administrative problem in Miles and Snow's (1978) adaptive cycle. The MCS types reflect how management solves the administrative problem and each MCS type may be better suited to solve either the entrepreneurial or the engineering problem. The administrative problem has received limited interest and prior research has focused on individual properties of the top management, organisation, structure, coordination or performance measurement (Thomas and Ramaswamy, 1996). As a third contribution, this study demonstrates the use of archival accounting and TMT data as proxies for organisation-level MCS archetypes and business strategies to study the MCS – business strategy link. Extant research has mostly relied on personal interviews and surveys of informants (Otley, 2016).

5.1 Managerial implications

Management is tasked with developing a business strategy for their organisation how it will compete and position itself in their markets (Langfield-Smith, 1997). Management selects and uses a collection of control processes and mechanisms forming the MCS to reach their predetermined objectives and goals (Malmi and Brown, 2008). Prior studies suggest the MCS should be aligned with the business strategy as a misfit would impair performance (Chenhall, 2003; Gani and Jermias, 2012). Although the defender, analyser and prospector strategies are all viable (Miles and Snow, 1978), the results of this study suggest aligning strategy and MCS improves performance. A defender strategy could benefit from control-oriented market or hierarchy MCS types and a prospector strategy from flexibility-oriented clan or adhocracy MCS types. Although a clan MCS type performed best with an analyser strategy, all the other MCS types gave acceptable performance.

The results also provide knowledge about matching managers with the business strategy and the MCS. The upper echelons theory (Hambrick and Mason, 1984) has been widely used to

explore the effect of top management on organisation strategy and performance. According to the upper echelons theory the top executives past experiences, values and personalities are reflected in their strategic decision-making and the following results (Hambrick, 2007). The TMTs of the different MCS types exhibited differing functional backgrounds, ages and tenures. The results suggest top management with extensive general management experience successfully implemented a defender strategy with a market or hierarchy MCS type, while top management with diverse backgrounds was better implementing a prospector strategy using a clan or adhocracy type MCS. Prior studies have also noted differences in the backgrounds of top management pursuing the different strategies (Snow and Hrebiniak, 1980; Thomas and Ramaswamy, 1996). These findings suggest that the composition of the TMT should match the intended MCS type and business strategy.

5.2 Limitations and directions for future research
While the study gave new information on the relationship between business strategy, MCS type and performance, there are limitations to this study. Although cluster analysis is appropriate to group objects based on their characteristics, it can be criticised for being too effective and always generating clusters even if there is no rational basis for the result. The cluster solution should be theoretically supported to bear any relevance. Although the cluster solution results can be to some extent confirmed using stopping rules and using different seed points, cluster analysis does not test the significance of the presented result. While the results were very stable, the results are not conclusive and there is need to verify the different MCS types.

Although substantial effort was done to get a representative and generalisable sample, the data may have shortcomings. The sample consisted of firms from six industries over a period of 8 years, but it was limited to a single country. The strategy construct was calculated as average over 4 years limiting the sample in effect to 5 years. Future studies should collect longitudinal data over extended periods to study the dynamics and development of the relationship between business strategy, MCS type and performance.

Business strategy was measured as a strategy construct based on past financial data. This measure captures the realised rather than the intended strategy (Thomas and Ramaswamy, 1996) making comparison to extant survey-based studies measuring intended strategies difficult. There is a need to see how financial data and survey-based strategy measures compare. Despite these limitations, the present study has provided additional evidence on the relationship between business strategy, MCS type and performance.

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