Department of Industrial Engineering and Management

Organizing Corporate Procurement for Performance: Strategy, Organization, and Ambidexterity

Maria Anna Zangrillo Gallinaro

Aalto University

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Organizing Corporate Procurement for Performance: Strategy, Organization, and Ambidexterity

Maria Anna Zangrillo Gallinaro

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Abstract

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Abstract

Over the past decade, procurement focus has gradually shifted from pursuing mainly short-term goals toward a mix of short term goals pursued through exploitation and long term strategic goals pursued through exploration. This dissertation investigates organizational antecedents and performance consequences of exploration, exploitation, and their balance in procurement activities. In my theorizing I draw upon procurement literature and research on organizational ambidexterity from organization theory. I argue that centralization of procurement activities influences exploration and exploitation and their balance because it provides efficiency and scale benefits, creates critical mass and coordination across projects, and supports the resolution of conflicts. I further argue that strategic integration influences exploration and exploitation and their balance because it is likely to increase the focus on long-term goals, yet also allows procurement to deliver impact on short-term projects and provides procurement with the necessary information to manage trade-offs among the two. Contextual ambidexterity is expected to enhance exploration, exploitation and their balance through a set of norms, values, incentives, processes and practices that enable to manage conflicting demands. Regarding the performance implications of exploration, exploitation and their balance, I predict positive effects given that exploitation allows the organization to address short-term goals while exploration enables achieving longer term goals and the balance of exploration and exploitation enables the organization to simultaneously achieve these often conflicting goals.

Using data from a survey of 118 industrial organizations in Finland and Switzerland I find that, in line with my predictions, centralization is positively related to exploration, exploitation, and their balance. I further find that strategic integration is positively related to all three, as I predicted. For contextual ambidexterity, I find that performance management, one of the sub-dimensions of contextual ambidexterity, is positively related to exploration, exploitation, and their balance whereas support, a second sub-dimension, is related to exploitation and trust, a third sub-dimension, is related to the balance of exploration and exploitation. Regarding performance implications, I find that both exploration and the balance between exploration and exploitation are positively related to financial procurement performance and procurement innovation performance whereas exploitation exhibits no relationship to any dimension of procurement performance.

My arguments and results add important new theoretical insights to the literatures on strategic contributions of corporate procurement, procurement's role in innovation, and the literature on ambidexterity on the organizational unit level and have important practical implications for the design and management of procurement organizations.

Keywords procurement, strategy, organization, ambidexterity, performance

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Tagelswangen, 28 May 2017
Maria Anna Zangrillo Gallinaro

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1. Introduction

This first chapter of the dissertation lays out the background of research on the strategic perspective of procurement, identifies the research problem and key objectives of the work and states key limitations of the scope. Next, I define key terms. Finally, the structure of the dissertation is presented.

1.1 Background

During the past two decades, procurement has gained increasing attention in both the corporate and academic contexts (Ellram and Carr, 1994, Gottfredson et al., 2005, Peterson et al., 2013) and the focus of procurement organizations has shifted toward a more strategic orientation. While procurement was originally seen by both practitioners and academics as an purely operational activity (Ramsay, 2001), increasingly practitioners and the scholarly community have begun to recognize its strategic importance (Chen et al., 2004, den Butter and Linse, 2008, Gottfredson, Puryear and Phillips, 2005, Mol, 2003). Underlying this increasing importance, has been the trend that industrial corporations source the majority of inputs into products and services from external sources (Gottfredson, Puryear and Phillips, 2005), so that depending on the industry and nature of the business, the external spend can contribute to as much as 80% of the corporate costs.

Given the increased importance of procurement, both managers and scholars have realized that giving attention and investing resources in the procurement function can lead to higher profitability. For instance, a recent study by the IBM Institute for Business Value (Peterson, Webber, Rosselli and Schaefer, 2013) showed that companies with high performing procurement organizations have reported profit margins of 7.12 % compared to the 5.83% of companies with low performing procurement organizations. Also a number of academic studies suggest a corporate performance impact of procurement (Ellram and Carr, 1994, Gonzalez-Benito, 2007, Liker and Choi, 2004, Spekman et al., 1994).

With the increasing importance of procurement in corporations, the focus of procurement has shifted from purely short term goals often referred to as exploitation (March, 1991, Tushman and O'Reilly, 1996) that are associated with operational goals such as cost savings, supplier reduction or invoice reduction towards a mix of short term goals and longer term strategic goals, often referred to as exploration (March, 1991, Tushman and O'Reilly, 1996) that are associated with strategic goals such as experimentation, innovation and renewal.

Research on procurement has mirrored the increasing strategic importance of procurement and the changed emphasis in its focus. Relevant for this dissertation are in particular two streams of research. First, studies examining the strategic importance of procurement (Chen, Paulraj and Lado, 2004, den Butter and Linse, 2008, Gottfredson, Puryear and Phillips, 2005, Mol, 2003) suggest that procurement has the potential to contribute to a broader range of long-term strategic goals beyond short term cost and efficiency related goals (Krause et al., 2001) by arguing that procurement should pursue both exploration and exploitation. This research further suggests that when focused upon such a broader set of goals, procurement may become a source of competitive advantage for the corporation (Chen, Paulraj and Lado, 2004, Kotabe and Murray, 2004, Rajagopal and Bernard, 1993, Trent and Monczka, 2002). While this stream of research has been instrumental in raising the awareness of the overall importance of procurement and its potentially strategic role, it has been often relatively vague in specifying the exact mechanisms through which such a role is achieved as well as their organizational antecedents and detailed performance consequences. My dissertation aims to contribute to this stream of research by providing a novel perspective to conceptualizing procurement's strategic contributions that draws upon concepts borrowed from strategic management and organization theory literatures and thereby providing a basis upon which future research may further build.

A second stream of procurement research has focused on the role of procurement for a specific exploration related goal, namely innovation. Under headings such as early supplier involvement (e.g., Bidault and Despres, 1998, Hartley et al., 1997, Johnsen, 2009, Petersen et al., 2003, Petersen et al., 2005, Schiele, 2010, Takeishi, 2001), innovative supplier search (e.g., Langner and Seidel, 2009, Pulles et al., 2014, Schiele, 2006), or supplier innovation management (Aminoff et al., 2016), a substantial stream of research has investigated how procurement can contribute to corporate innovation activities. However, this research leaves the question, largely unanswered of how procurement can balance this focus on exploration and innovation with the short term exploration related goals like cost efficiency that continues to be central to procurement (Schiele, 2010). My dissertation aims to contribute to this stream of research by investigating how procurement can balance exploration and exploitation related goals, what are the antecedents of such a balance and what are its performance consequences. To do so, I draw upon related research from organization theory.

A long tradition of research in organization theory suggests that pursuing exploration and exploitation goals simultaneously may require structures and actions that are fundamentally at odds and it is therefore difficult to pursue both simultaneously in the same organization (March, 1991, Tushman and O'Reilly, 1996). In fact, in organization theory, a rich literature that investigates how firms can balance such conflicting goals under the heading of ambidextrous organizations (Lavie et al., 2010, Raisch et al., 2009) has emerged that argues that organizational design can help to address the tension between exploration and

exploitation. This research has focused mostly on the firm level of analysis investigating how the organization as a whole can balance exploration and exploitation through different organizational designs.

While prior research on the firm level of analysis has provided much insight on ambidexterity, balancing exploration and exploitation would seem also important on a lower level of analysis such as a single activity domain or within a single organizational function like procurement. For instance, in research and development activities a balance needs to be struck between short term exploitation of existing technologies and the development of novel technologies through exploration (e.g., Rothaermel & Alexandre, 2009). Similarly, supply chain activities may need to balance explorative and exploitative practices (Kristal, Huang, & Roth, 2010). While organizational ambidexterity would seem important also on this lower level of analysis, research that investigates ambidexterity in specific functional contexts is still scarce and it is not self-evident that the insights from the firm level of analysis directly apply on lower levels of analysis. My final aim in this dissertation therefore is to contribute novel insights into organizational ambidexterity on the unit level focusing on the context of the procurement organization and investigating organizational design elements that may allow to balance exploration and exploitation on this level of analysis.

1.2 Research problem

In this dissertation, I examine the organizational antecedents and performance consequences of ambidexterity in the context of procurement. Under organizational antecedents I understand such factors as structures, processes, and practices that shape the organizational context within which procurement activities occur (Ghoshal and Bartlett, 1994, Markides, 2013). Specifically, I investigate two related research questions.

1. What organizational antecedents influence exploration, exploitation and their balance in the context of procurement?
2. How do exploration, exploitation, and their balance affect the performance of procurement activities?

In order to address these research questions, I draw upon the organizational level research on ambidexterity, extend it to the functional level of analysis, and combine it with the literature on procurement. This dissertation therefore integrates research in organization theory with research in procurement. Specifically, I will develop and test novel predictions on how organizational antecedents influence the level of exploration and exploitation in procurement and their balance. I further develop and test predictions on how exploration, exploitation and their balance affect the performance of the procurement function.

1.3 Objectives

The overall objective of this dissertation is to identify antecedents and consequences of exploration and exploitation and their balance in procurement. The detailed objectives of the dissertation can be stated as follows:

1. To review prior research on the organization of procurement and its relation to exploration and exploitation in procurement activities.
2. To conceptualize and develop hypotheses on how organizational factors influence exploration and exploitation and their balance in procurement activities.
3. To conceptualize and develop hypotheses on how exploration, exploitation, and their balance influence procurement performance.
4. To empirically test the hypotheses regarding the antecedents and consequences of exploration, exploitation and their balance in procurement using a suitable sample of procurement organizations.
5. To present implications for theoretical and empirical research in procurement.
6. To draw conclusions for procurement practice and the organization of procurement activities in industrial firms.

1.4 Scope and limitations

The research focuses on procurement organizations in large industrial firms. While procurement is an important topic in the private and public sector, procurement in the public sector has been found to differ substantially from procurement in private enterprises (Boyne, 2002, Edquist and Zabala-Iturriagagoitia, 2012, Matthews, 2005, Thai, 2001). Therefore, public procurement is outside of the scope of this dissertation.

Given that the study focuses on organizational factors, the topic is of highest relevance in medium to large enterprises that have a dedicated procurement function. Small firms tend not to have sufficiently large procurement volumes to establish dedicated procurement organizations and therefore are outside of the empirical scope of this dissertation.

The geographical scope of the empirical part of this dissertation was limited to Finland and Switzerland. This choice was motivated by a trade-off between pragmatic constraints in achieving a sufficient sample size and the necessity to understand and control country level heterogeneity. A focus on a selected number of countries reduces the risk of unobserved heterogeneity stemming from differences in the institutional environment that may affect the way procurement organizations are set up and operate. Furthermore, studying procurement activities in countries where I had worked personally provided me with a sufficient understanding of the institutional environment and its potential impact on procurement activities. Finland and Switzerland are both relatively small countries with a limited population of companies such that a sufficient sample size would not have been possible in either country alone. Finally Finland and

Switzerland are both developed, open economies that are similar enough to allow for comparison.

The main units of analysis are the procurement organization and the corporation it is embedded into. By focusing on the functional unit as the level of analysis, it is possible to gain novel insights into ambidexterity that has so far focused mostly on the firm level.

1.5 Key Concepts

Procurement. In this dissertation, I use the term procurement to refer to all "essential activities associated with the acquisition of the materials, services, and equipment used in the operation of an organization" (Dobler and Burt, 1996). This includes activities such as identifying potential suppliers and negotiating prices (Quintens et al., 2006, van Weele, 2014) that is fundamentally operational activities, but also higher strategically embedded activities such as outsourcing of business processes, design of technology roadmaps and broad participation in strategic planning (Carr and Smeltzer, 1997, Gottfredson, Puryear and Phillips, 2005, Spekman, Kamauff and Salmond, 1994).

While throughout this dissertation, I consistently use the term procurement that is most commonly used among practitioners and encompasses all operational and strategic tasks as defined above (Baily et al., 2015), the procurement literature at large has used a broad variety of alternative, often overlapping, terms and definitions including external resource management (Tanskanen et al., 2012), purchasing (van Weele, 2014), procurement (Baily, Farmer, Crocker, Jessap and Jones, 2015), sourcing, and supply management (Kraljic, 1983) to mention only a few. For instance, Kraljic (1983: 110) introduces the term supply management to emphasize that procurement needs to take a strategic perspective on procuring "a volume of critical items competitively under complex conditions" and denotes the term purchasing to mean a more operational perspective on the same task. In contrast, Van Weele (2014: 8) defines purchasing as "managing the company's external resources in such a way that the supply of all goods, services, capabilities and knowledge which are necessary for running, maintaining and managing the company's primary and support activities is secured at the most favorable conditions", a definition that is very similar to the one used above for procurement. Van Weele (2014:6) subsumes purchasing under the procurement term which he views as "all activities required in order to get the product from the supplier to its final destination". Therefore in his view, in addition to purchasing, procurement also includes activities related to logistics and quality control. At times, also the term sourcing is used with very similar meaning in the literature. While procurement focused literature typically views sourcing relatively narrowly as the tasks of "finding, selecting, contracting, and managing the best possible source of supply" (van Weele (2014: 10), related research on sourcing in for instance technology management (Swan and Allred, 2003, van de Vrande et al., 2006) or strategic management (Nicholls-Nixon and Woo, 2003, Rothaermel and Alexandre, 2009) that is relevant for the context of this dissertation, has viewed sourcing more broadly including for instance the

make or buy decision (Pisano, 1990, Steensma and Corley, 2001, van de Vrande, Lemmens and Vanhaverbeke, 2006). Given the overlap of terms and definitions, in my search and reading of the literature, I also included the above alternative terms as synonyms to ensure a comprehensive coverage of the literature.

Procurement can be further distinguished into direct procurement and indirect procurement. Direct procurement refers to the procurement of products and services that relate directly to revenue generation either by becoming part of products being sold or by being used directly in the provision of services. Direct procurement can cover up to 80% of the total cost a corporation incurs (Iloranta and Pajunen-Muhonen, 2008) and tends to be industry specific. Indirect procurement refers to the procurement of all other products and services at times also referred to as the procurement of non-production items (e.g., Cox et al., 2005). It typically consists of a large number of low value items that are purchased in frequent intervals. Indirect procurement covers a broad variety of items that tend to be industry neutral (e.g. travel services, facility management, or professional services). Nonetheless the total indirect spend can range from 30% of total spend in manufacturing industries to well over 50% in services (Cox, Chicksand, Ireland and Davies, 2005, de Boer et al., 2003).

From the perspective of this study, the distinction between product focused and service focused organizations is important since it may influence the structure and focus of procurement. Differences between direct and indirect procurement are summarized in Table 1. For instance indirect procurement contains a large fraction of services and, Ellram Tate, and Billington (2004) suggest that services require different procurement and supply chain processes and tools. For instance, services as an input have characteristics that are fundamentally different from products. Services are produced and consumed in an interactive process in which both the buyer and the seller actively participate (van der Valk, 2008). Therefore, the buying organization is not only a customer but acts as a co-producer of the service creating a higher importance for well managed interfaces and interaction processes. As a result for successful services sourcing factors such as buyer capabilities relating to planning and requirements management are complemented by the need to manage the interaction with the supplier (van der Valk, 2008).

Table 1 Direct versus indirect procurement adapted from (Gebauer and Segev, 2000)

Direct, production-oriented materials	**Indirect, non-production related items and services**
Schedules	Not schedules
Fewer orders	More orders
Relatively homogeneous items	Diverse items
Production items	Miscellaneous items
Usually no shelf items	Usually shelf items
Inventory accounts	Expense and asset accounts
Buying easier to control	Buying often out of procurement's control
Buyers' desktop only	Everybody's desktop
No approvals (depending upon maturity of the procurement organization)	Approvals required
Bill of materials	Aggregated catalogs

Exploration and exploitation. In this section, I define exploration and exploitation on an abstract level as done in prior research in organization theory. A more detailed conceptualization in the context of procurement follows in chapter 4 against the backdrop of the review of procurement literature.

In his seminal study, March (1991) defines exploration activities as including "things captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery, innovation" (March, 1991: 71). He goes on to define exploitation activities to include "such things as refinement, choice, production, efficiency, selection, implementation, execution" (March, 1991: 71). Later research has developed a variety of further conceptualizations at times viewing exploration and exploitation as independent activities and at other times viewing it as the opposite ends of a continuum of activities (Gupta et al., 2006, Lavie, Stettner and Tushman, 2010).

In this dissertation, I do not view exploration-exploitation strictly as a continuum of activities but rather a portfolio of activities among which tensions and trade-offs exist in resource allocation decisions and in management approaches. Given resource allocation constraints organizations need to make conscious choices to allocate time, attention, and resources to either short-term and productivity oriented activities or to long-term innovation and learning oriented activities (March, 1991). Allocating resources to exploitation produces relatively certain immediate returns and thereby leads to organizational stability and inertia, and may in the long run increases the risk of becoming obsolete (Holmqvist, 2004, Lewin et al., 1999). Allocating resources to exploration produces less certain and more temporally distal benefits that enhance adaptation and flexibility, however potentially at the expense of short-term survival and performance.

Given the trade-offs between exploration and exploitation one may expect a strictly negative association between exploration and exploitation activities. Accordingly some early research claimed that organizations are unable to simultaneously achieve effective exploration and efficient exploitation (Hannan and Freeman, 1977, McGill et al., 1992, Miller and Friesen, 1986). Furthermore, the choice between exploration and exploitation is likely to exhibit a path dependence such that in particular investment in exploitation is likely to drive out exploration given the more immediate benefits (Benner and Tushman, 2003, Levinthal and March, 1993). However, following the seminal study of March (1991) that postulated survival and performance benefits of balancing exploration and exploitation, a rich research stream has emerged that has identified antecedents, consequences and contingencies of balancing exploration and exploitation. Also empirical research (Katila and Ahuja, 2002, Park et al., 2002) suggests that organizations can take actions to mitigate the tension between exploration and exploitation and may even combine them in ways that are synergistic (Lavie, Stettner and Tushman, 2010).

Organizational Ambidexterity. In common language use, the term ambidexterity refers to the ability to use the left and right hand equally well. This idea has been adapted to the organizational context where, drawing upon the

insights of Duncan (1976), organizational ambidexterity has been conceptualized as the organization's ability to be "aligned and efficient in its management of today's business demands while simultaneously being adaptive to changes in the environment (Raisch and Birkinshaw, 2008: 375). As such ambidexterity can be viewed as a dynamic capability organizations possess that is antecedent to exploration, exploitation, and their balance (O'Reilly and Tushman, 2008). As a dynamic capability it is a collection of organizational routines with associated input flows that allow a firm to consistently adapt its activities (Winter, 2000, Winter, 2003). Whereas firms that lack ambidexterity, are forced to either focus on exploration or exploitation, ambidextrous firms can adjust their strategic orientation such that they can accomplish both at the same time (but do not have to).

A rich literature has emerged that identifies different organizational antecedents that foster organizational ambidexterity and thereby enable balancing exploration and exploitation (see, for instance, Lavie, Stettner and Tushman, 2010, Raisch, Birkinshaw, Probst and Tushman, 2009, Turner et al., 2013 for recent reviews). Specifically ambidexterity can be achieved by separating exploration and exploitation either organizationally, in time or in activity domain. Finally it can be achieved by creating an organizational context that allows to manage the tension between exploration and exploitation without separating them (Ghoshal and Bartlett, 1994, Gibson and Birkinshaw, 2004, Markides, 2013). These organizational antecedents are the focus of this dissertation.

1.6 Structure of the dissertation

The dissertation is structured into three parts and 10 chapters. Following the introduction in this chapter, the first part of the dissertation contains the theoretical background spanning the next three chapters. Specifically, chapter 2 reviews the changing landscape of procurement activities and argues that procurement has moved towards a strategic role that requires balancing long term exploration activities with short-term exploitation activities. Given that organization design is central to driving the strategic role of procurement and that research on ambidexterity emphasizes the important role of organizational design, in chapter 3 I present a literature review on procurement and organization. This is followed by a review on prior research on exploration, exploitation, and ambidexterity in chapter 4. The second part consisting of Chapters 5 and 6 contains the conceptual framework for the study and develops predictions to be tested in the empirical part. Specifically, chapter 5 develops predictions regarding the antecedents of exploration, exploitation, and their balance. Chapter 6 develops predictions regarding the performance consequences of exploration, exploitation, and their balance for procurement performance. The third part of the dissertation in Chapters 7 to 9 contain the empirical part. In chapter 7, I present the methods. Chapter 8 presents a descriptive analysis of the data. Chapter 9 then tests the hypotheses of chapters 5 and 6 using OLS regression models. In the final chapter (chapter 10) I briefly summarize the results, discuss the implications of the dissertation for research and practice, discuss limitations

of the study and present some pointers for future research. The structure is illustrated in Figure 1.

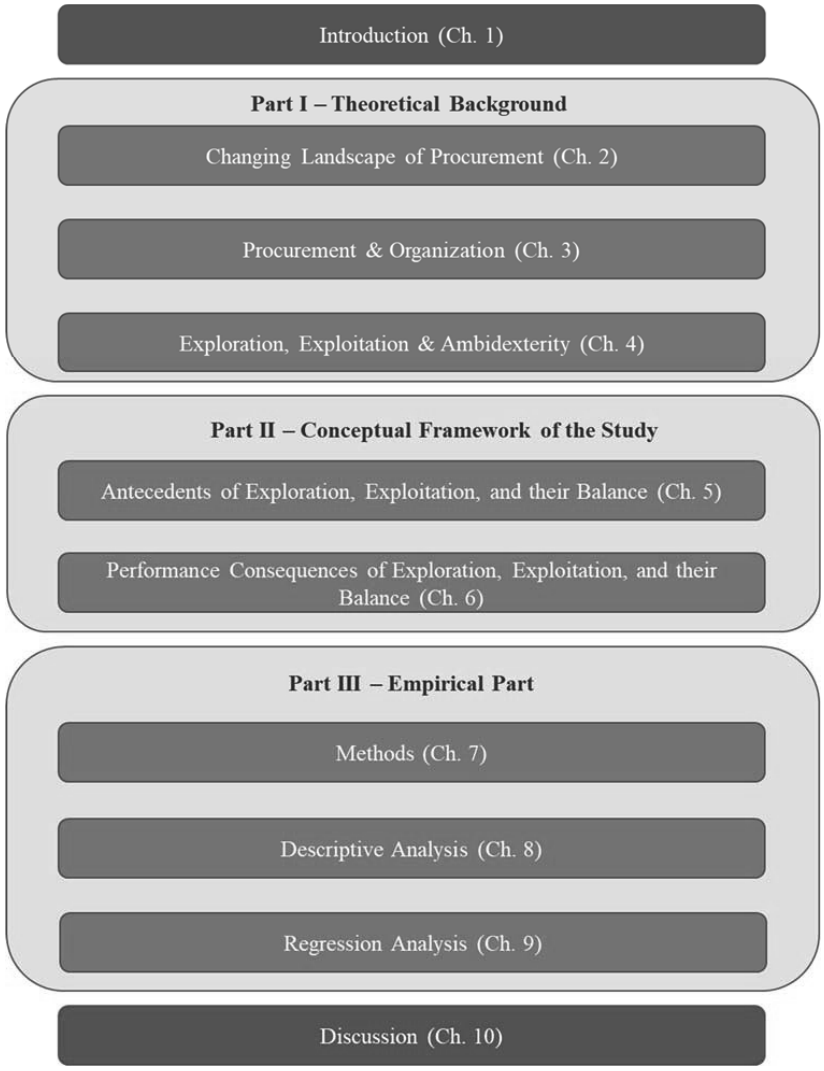

Figure 1 Structure of the dissertation

Part I – Theoretical Background

2. The Changing Landscape of Procurement

In this chapter, I briefly review the evolution of procurement toward a strategic function in the corporation and its implications for key challenges of procurement. In the first section, I start with a very brief history of procurement's transformation toward a strategic function. In the second section, I examine some of the implications of viewing procurement as a strategic function. The third section then zooms in on the role of procurement in innovation.

2.1 From administrative to strategic function

Although corporate procurement has a long history (Leenders and Fearon, 2008), the role of procurement has dramatically transformed during the past 30 years given changes in the external environment and the resulting changes in procurement organizations and practices such as globalization of procurement, emergence of e-business, and outsourcing (Zheng et al., 2007). Until the late 1970s most research and practitioners have viewed procurement as an administrative and tactical function with little strategic value (Araujo et al., 2016, Ramsay, 2001). Procurement work consisted mostly of clerical work. Supplier relationships were mostly arms-lengths and suppliers were viewed as providers of interchangeable commodities (Araujo, Gadde and Dubois, 2016). As a result, procurement received relatively little attention from top management and rather was relegated towards a back office function (Carter and Narasimhan, 1996).

The 1980s and first half of the 1990s were characterized by high level of change in terms of organization structures employed for corporate procurement, job titles used for procurement leaders and their reporting relationships in the corporation, and the nature of interactions with suppliers (Araujo, Gadde and Dubois, 2016, Johnson and Leeders, 1998). The focus of procurement during this period shifted towards utilizing more differentiated approaches towards managing suppliers (Kraljic, 1983) and relationships with key suppliers shifted towards deeper, cooperative relationships (Araujo, Gadde and Dubois, 2016). Yet more established models gradually emerged in the late 1990s and during the 2000s when procurement gradually started to mature as an important organizational function. Today, procurement is widely recognized as a strategic function that makes important contributions to competitive advantage and corporate performance (Chen, Paulraj and Lado, 2004, den Butter and Linse, 2008, Gottfredson, Puryear and Phillips, 2005, Mol, 2003). This maturation process

was the outcome of the gradual realization of the potential strategic contributions of procurement (Ellram and Carr, 1994) that occurred through a stream of research that established a systematic link between procurement and corporate performance (Ellram and Carr, 1994, Gonzalez-Benito, 2007, Liker and Choi, 2004, Spekman, Kamauff and Salmond, 1994) and began to explore the antecedents and moderators of this relationship. For instance, procurement has been found to impact various dimensions of manufacturing performance (Narasimhan and Das, 1999, Narasimhan and Das, 2001), supply chain performance (e.g., Paulraj et al., 2006) as well as corporate wide financial performance indicators (Carr and Pearson, 2002, Carr and Smeltzer, 1999).

The broader realization of procurement's strategic role was also facilitated by the globalization of procurement as part of overall corporate globalization. In particular during the 1990s, organizations gradually expanded the geographic sourcing scope towards global sourcing strategies (Bozarth et al., 1998, Cavusgil et al., 1991, Giunipero and Monczka, 1990, Murray et al., 1995, Samli et al., 1998, Trent and Monczka, 2002, Trent and Monczka, 2003, Zeng, 2003). While companies from different parts of the world have taken slightly different routes towards globalization of the sourcing activities, they seem to be gradually converging towards integrated global sourcing strategies (Quintens et al., 2005).

As organizations develop their international procurement activities they gradually move from a strategy of ad hoc international procurement towards a developed global sourcing strategy (Bozarth, Handfield and Das, 1998, Trent and Monczka, 2003). Without a global sourcing approach that includes established sourcing plans and established supply chain infrastructure such as sourcing, distribution, and service networks, and intense integration and coordination of sourcing strategies across worldwide buying locations and with worldwide functions, it is almost impossible to exploit the emerging technological and market opportunities around the world (Kotabe and Murray, 2004). However this requires unprecedented coordination among R&D, manufacturing, and marketing activities across the globe and (Kotabe and Murray, 2004) and even more importantly a tight integration into strategic planning (Samli, Browning and Busbia, 1998).

Despite the widespread recognition of procurement's important strategic role for corporate competitive advantage and innovation, it is important to note that in practice its full-fledged transformation is progressing adequately only in some organizations (Cousins and Spekman, 2003). Recent research based on the International Purchasing Survey suggest that even today critical bottlenecks continue to exist that hold back organizations' potential to realize the strategic benefits from procurement (Knoppen and Saenz, 2015).

One of the central bottlenecks to elevate procurement to a strategic role relates to effective procurement organization. Organization design is one of the main mechanisms that enable or hampers the implementation of a strategic thrust (Chandler, 1962). This may hold in particular in procurement where organizational designs for strategic procurement have only gradually emerged and matured (Johnson et al., 2014).

2.2 Strategic Procurement and Its Implications

With the increased recognition of the strategic role of procurement for the corporation, academic literature has explored the concept of strategic procurement and its implications for the management of procurement.

Strategic procurement. Following Carr and Pearson (1999), Sánchez-Rodríguez (2009) defines strategic procurement as the "process of planning, implementing, evaluating, and controlling strategic and operating purchasing decisions for directing all activities of the purchasing function towards opportunities consistent with the firm's capabilities to achieve long-term goals" (p. 162). This definition underlines the importance of an alignment of procurement and firm strategy. Benefits from such a strategic alignment include cost, flexibility, delivery speed and reliability, the confirmation of customer orders, and handling customer complaints (Bernardes and Zsidisin, 2008). The concept of strategic procurement has been further refined. Carr and Smeltzer (1997) point to the difference between strategic procurement and procurement strategy. Whereas procurement strategy refers narrowly to a set of specific actions to achieve objectives in line with business strategy, strategic procurement relates to the broader definition of what role procurement plays in the strategic management of the corporation.

Over time the literature started to use a broader set of terms including strategic procurement, strategic purchasing (Bernardes and Zsidisin, 2008, Carr and Pearson, 1999, Carr and Pearson, 2002, Carr and Smeltzer, 1997), strategic sourcing (Ogden et al., 2007), or strategic supply management (Paulraj and Chen, 2007). While these terms differ at the fringes, they share a common core in the fact that the procurement organization creates a strategic contribution in the corporation and therefore plays a strategic role. In this dissertation I will therefore use the term strategic procurement.

Antecedents and Contributions of Strategic Procurement. Starting from the view of procurement as a strategic contributor in the corporation, research of strategic procurement has provided important insights for the management of procurement. These insights relate to the contributions of strategic procurement as well as the factors that hamper or enable the strategic contribution.

Bernardes and Zsidin (2008) argue that strategic procurement creates value through the management of external relationships. Specifically, by aligning the type of relationships used with the requirements set by the supply pace to the corporation, strategic supply management creates benefits such as lower cost, increased flexibility, improved delivery speed and reliability, and, in the case of direct procurement, improved management of customer orders and complaints. Empirically they show that strategic supply management impacts customer responsiveness through its effect on relational embeddedness and network scanning (Bernardes and Zsidisin, 2008).

Carr and Pearson (2002) suggest that procurement contributes to the firm through its involvement with key suppliers and by aligning procurement strategies with the corporate strategy. A strategic procurement function contributes to competitive advantage in several ways. It provides direct value through cost management; it provides strategic information on supply market trends; it establishes close relationships with core suppliers to improve quality and efficiency of delivery; it creates a tight link with the external resources of the organization; and it professionally manages these external resources as if they were an extension of the organization.

Chen and colleagues (Chen, Paulraj and Lado, 2004) argue that strategic procurement can engender sustainable competitive advantage through three mechanisms at least in the context of direct procurement. It enables close relationships with key suppliers, provides open communication with the suppliers and thereby enables to develop long-term relationships with key suppliers. Through these three dimensions of supply management the firm is able to achieve better customer responsiveness and ultimately improved financial performance.

Paulraj and colleagues argue that strategic procurement requires (1) strategic focus through formal long-range plans and a focus on long-term issues; (2) strategic involvement captured through the involvement of the procurement function in the strategic planning process and the knowledge of strategic goals, performance measurement focused on corporate performance, development of procurement personnel based on corporate strategy, and top management's emphasis on the procurement function's strategic role; and (3) procurements visibility and status relative to top management (Paulraj, Chen and Flynn, 2006). Firms that achieve higher levels of strategic procurement often exhibit better supply integration and better supply chain performance (Paulraj, Chen and Flynn, 2006). According to Ogden, Rossetti and Hendrick (2007) strategic procurement rests on (1) professionalism including procurement's skills, knowledge and attitude, (2) status within the organization, and (3) supply management that is its capabilities in managing relationships. Finally, Paulraj and Chen (2007) relate strategic procurement to supply management at large. They argue that strategic supply management consists of strategic procurement, long-term relationship orientation, communication, cross-organizational teams, and supplier integration.

Strategic Procurement and Procurement Goals. Central to this dissertation is the insight that viewing procurement as strategic suggests a broader range of goals and objectives that procurement needs to pursue. Whereas traditional objectives of procurement such cost efficiency or delivery reliability are relatively short term, strategic procurement brings longer term operational goals and objectives such as flexibility and innovation to the procurement agenda (Krause, Pagell and Curkovic, 2001). Yet more radical, theories of strategic alignment suggest that the competitive potential of procurement critically depends on whether procurement activities are aligned with the organization's overall strategy thereby moving all strategic goals of the corporation into the agenda of procurement (Baier et al., 2008). Corporate and business strategies

set the direction and boundary conditions within which functional strategies are to specify how functional activities should be carried out to support the overall goals of the corporation. The importance of alignment was first recognized in the context of operations and captured in the idea of the theory of production competence (Cleveland et al., 1989, Vickery, 1991). The concept was later extended to other functional domains and in particular also to procurement (Das and Narasimhan, 2000, Gonzalez-Benito, 2007).

Introducing a broader range of goals that strategic procurement may need to pursue, however, implies that procurement needs to find ways to pursue these goals simultaneously and balance them even when they raise conflicting demands. Prior research on strategic procurement has not directly addressed such goal conflicts arising from a broader strategic agenda and how to resolve them. However, research on strategy implementation (Chandler, 1962) suggests that organization design is central in managing such broader strategic goals and their conflicts. In chapter 3, I will therefore review organization design in procurement. In chapter 4, this dissertation will further draw upon organization theory and specifically theories of balancing short term and long term goals related to exploration and exploitation to provide some further insights into the nature of goal trade-offs and how organizations manage them in procurement.

2.3 Procurement and innovation

One objective that has emerged as particularly important from the discussion on strategic procurement is innovation. For instance, Carr and Pearson (2002) point to the importance of procurement in new product development and more broadly to innovation as one of the key levers to elevate procurement to a strategic level. Involvement of procurement in new product development activities enables to make a strategic contribution to the firm's performance (Carr and Pearson, 2002).

Whereas research on strategic procurement has emphasized the importance of innovation as s long term strategic objective of procurement, a broader procurement literature has investigated the role of the procurement organization in new product development activities under such headings as early supplier involvement (e.g., Bidault and Despres, 1998, Hartley, Meredith, McCutcheon and Kamath, 1997, Johnsen, 2009, Petersen, Handfield and Ragatz, 2003, Petersen, Handfield and Ragatz, 2005, Schiele, 2010, Takeishi, 2001), innovative supplier search (e.g., Langner and Seidel, 2009, Pulles, Veldman and Schiele, 2014, Schiele, 2006), or supplier innovation management (Aminoff, Kaipia, Pihlajamaa, Tanskanen, Vuori and Makkonen, 2016).

Prior research suggests that procurement has the potential to play an ever increasing role in corporate innovation activities since corporations are more and more increasing their reliance on external sources of innovation. Whereas in the past, most technology development and new product development have taken place within the boundaries of the firm, under the open innovation paradigm (Chesbrough, 2003) corporations increasingly rely upon suppliers to gain access to ideas, knowledge, and technologies (Laursen and Salter, 2006). That

becomes necessary given the increasing complexity of technology in most industries (Patel and Pavitt, 1997), the advent of venture capital to fund specialized technology-based firms combined with the increasing globalization of markets for technology that intensifies competition and forces firms to become more efficient and effective in their technology development, and finally the increasing mobility of workers (Chesbrough et al., 2006, Chesbrough, 2003). Integration of suppliers into the new product development process has been found to enable shorter time to market, improved product quality and in the long run reduced development cost, as well as improved product cost (Johnsen, 2009).

In such an open innovation paradigm, procurement should play a critical role in facilitating the tight integration of suppliers into the new product development process. At least three specific roles can be identified (Aminoff, Kaipia, Pihlajamaa, Tanskanen, Vuori and Makkonen, 2016). First, procurement can play an important role in searching and selecting innovative suppliers. That involves monitoring supplier markets and providing supply market intelligence (e.g., Cousins et al., 2011, Zsidisin et al., 2015), identifying innovative suppliers (e.g., Pulles, Veldman and Schiele, 2014, Schiele, 2006), and evaluating suppliers for their potential contribution to corporate innovation (e.g., Pulles, Veldman and Schiele, 2014, Schiele, 2006, Song and Di Benedetto, 2008, Wagner, 2010). Second, procurement can facilitate the development of innovations with these suppliers through setting up relationships that are suitable for joint development and managing these relationships for success (e.g., Ellis et al., 2012, Mooi and Frambach, 2012, Sobrero and Roberts, 2002). Finally, procurement can be instrumental in stimulating suppliers' innovation activities by supporting and directing the innovation activities of the supplier (e.g., Jean et al., 2015, Noordhoff et al., 2011, Wynstra et al., 2010, Wynstra et al., 2003).

While research on the role of procurement in corporate innovation activities has identified important antecedents and benefits of pursuing innovation as a procurement goal, it is relatively silent about how procurement can balance the innovation goal with other important procurement goals such as short term cost effectiveness and delivery reliability and in particular what organizational designs can support such a dual focus (Schiele, 2010). To derive some pointers for how firms can design organizations that allow to balance innovation goals with other procurement goals the following two chapters will provide a brief review on the overall role or organization design in procurement and the organizational designs for ambidexterity from the organization theoretical literature.

3. Procurement and Organization

In the previous chapter I argued that organization design is central to driving the strategic role of procurement. In this chapter I review key findings regarding procurement organization design thereby preparing the ground for the model development in the subsequent chapters. The chapter starts with a brief review of the disciplinary roots of literature on procurement organization design. Next I review key findings regarding the structure of procurement organizations and its dimensions, influence factors on these structures, conceptualizations of procurement performance, and finally the implications of procurement structures for procurement performance.

3.1 Disciplinary roots of research on procurement organizations

Research on procurement organizations has emerged from two broad literatures. On the one hand, a stream of research in industrial marketing has investigated procurement organizations already since the 1960s. Research in marketing investigated procurement through the study of organizational buying behavior (see, for instance, Johnston and Lewin, 1996 for a review). This inquiry into buying behavior was driven by the quest of marketers to understand how to target their communications to the participants in the buying organization (Lau et al., 1999) and therefore emphasized who participates and influences buying decisions (Garrido-Samaniego and Gutiérrez-Cillán, 2004).

Initially this research in industrial marketing took a relatively undifferentiated view of procurement talking of buying groups or buying centers simply including all individuals involved in an organizational buying process. As procurement has matured and organizations have increasingly formed procurement organizations also the research has taken a more differentiated approach studying procurement organizations as separate organizations within the corporation.

Central to the research on procurement in industrial marketing is the concept of buying center that is the organization involved in procurement (e.g., Crow and Lindquist, 1985, Dawes et al., 1992, Garrido-Samaniego and Gutiérrez-Cillán, 2004, Geok-Theng et al., 1999, Johnston and Bonoma, 1981, Lau, Goh and Phua, 1999, Mattson, 1988, McCabe, 1987, McWilliams et al., 1992, Munnukka and Järvi, 2008, Wood, 2005). Research in this area has investigated variables related with buying center structure such as buying center size (e.g., McWilliams, Naumann and Scott, 1992, Wood, 2005), formalization, and

centralization (Johnston and Bonoma, 1981, Wood, 2005), and the buying center's involvement in decisions including lateral involvement, vertical involvement, and relative influence (e.g., Garrido-Samaniego and Gutiérrez-Cillán, 2004, Johnston and Bonoma, 1981, Lewin and Donthu, 2005). Others have investigated antecedents of buying center activity such as purchase situation related factors (Lau, Goh and Phua, 1999, Lewin and Donthu, 2005) or individual characteristics (Crow and Lindquist, 1985).

On the other hand, procurement organizations have also been studied within operations management. This core literature in procurement has investigated a broad range of topics related to procurement organizations (see, for instance, Glock and Hochrein (2011) and Schneider and Wallenburg (2013) for recent and comprehensive reviews of this literature). Research in this stream of literature has investigated structures of procurement organizations and their evolution (Cousins et al., 2006, Kotteaku et al., 1995, Wood, 2005), factors that influence the structures chosen (Germain and Droge, 1997, Germain and Droge, 1998, Kotteaku, Laios and Moschuris, 1995, Laios and Xideas, 1994, Xideas and Moschuris, 1998) and the effect of the procurement organization on procurement outcomes (Cousins, Lawson and Squire, 2006, Kotteaku, Laios and Moschuris, 1995).

3.2 Structure of procurement organizations

Based on its content, research on procurement organization can be distinguished into two streams. One stream of studies identifies specific configurations of procurement organizations that occur in practice. A second stream of studies instead focuses on specific dimensions along which all procurement organizations can be characterized.

The first group of studies adopts a configurational approach (Meyer, Tsui, & Hinings, 1993; Mintzberg, 1979) that suggests that a limited number of archetypes of procurement organizations exist that configure different dimensions of organizational design (Mintzberg, 1979). For instance, Cavinato (1991) identifies seven basic models of procurement organizations: centralized procurement, decentralized procurement, centralized coordination area planning, supply manager approach, commodity team approach, and logistics pipeline approach.

A variety of additional configurations have emerged since. For instance procurement teams are teams of members of multiple functions as well as suppliers and customers (Glock and Hochrein, 2011, Trent and Monczka, 1994). Commodity management refers to procurement organizations that develop and implement companywide strategies for a given commodity category (Englyst et al., 2008). Global sourcing has led to configurations of procurement activities such as international procurement groups, international procurement offices, regional sourcing committees, global sourcing project teams, product teams for sourcing components and materials, lead-buyers, and corporate contract coordinators (Carduck, 2000, Gelderman and Semeijn, 2006, Goh and Lau, 1998, Jia et al., 2014, Pagano, 2009). Increasingly organizations also utilize purchasing groups [sometimes also referred to as purchasing consortia (Essig, 2000),

cooperative purchasing (Cavinato, 1984), or purchasing alliances] that is procurement organizations that engage in procurement for a group of organizations (Doucette, 1997, Schotanus et al., 2010, Tella and Virolainen, 2005). While such purchasing groups have been relatively common in the public sector (Essig, 2000, Nollet and Beaulieu, 2003) and in the retail sector (Tella and Virolainen, 2005), more recently they are also being used for industrial procurement (Essig, 2000, Nollet and Beaulieu, 2005, Tella and Virolainen, 2005). It is clear that the specific configurations may change over time and therefore one important insight emerging from configurational studies (Wood, 2005) is that it may be more fruitful to analyze dimensions underlying these configurations.

Dimensions of organizational design that have been discussed in research on procurement organizations include standardization, specialization, configuration, involvement, formalization, and centralization (Glock and Hochrein, 2011). Standardization captures the degree to which organizational activities, processes, and routines are precisely defined and includes the sub-dimensions of process standardization, product standardization, and personnel standardization (Quintens et al., 2006). Specialization captures the division of labor in the procurement organization (Glock and Hochrein, 2011). Configuration "refers to the design of the authority structure of the organization and includes dimensions such as vertical and lateral spans of control, criteria for segmentation, and numbers of positions in various segments" (Glock and Hochrein, 2011: 156). Configuration understood in this way is therefore a measure of complexity of the procurement organization. Involvement is a variable mostly studied in the buying center research and marketing and focuses on lateral and vertical involvement that is the number of departments, divisions, or functional areas participating in procurement decisions and the number of hierarchical levels (Glock and Hochrein, 2011). Formalization captures the degree to which an organization relies on rules and procedures to direct the behavior of its members (Germain and Droge, 1998). Formalization largely determines the amount of discretion that procurement managers have in accomplishing the tasks. Such discretion can be reduced by narrowly defining roles and authority relationships and by establishing detailed rules that regulate decision processes, the communication of employees, and the processing of information in the organization (Glock and Hochrein, 2011).

3.3 Influence factors on the structure of procurement organizations

In parallel to research that investigated configurations of procurement organizations and their underlying dimensions, other studies have tried to link these configurations and their underlying dimensions to conditions in the firm or environment that may lead to them.

In a recent review of the literature on procurement organization and design, Glock and Hochrein (2011) identified four groups of contextual variables that affect the procurement organization: company external factors, purchase situa-

tion, product characteristics, and organizational characteristics. Company external factors include in particular the country of origin, the industry sector, and environmental uncertainty. The purchase situation involves time pressure, perceived risk, the importance of the purchase, the buy phase, and the buy class. Product characteristics include purchasing volume, purchase complexity, and product type. Organizational characteristics include organizational strategy, buyer characteristics, size of the buying organization, and the structure of the organization (Glock and Hochrein, 2011).

Germain and Dröge (1997, 1998) suggest that organizational design of procurement depends on the approach to procurement. In particular, firms pursuing just-in-time procurement develop structures that are more formalized, more integrated and more specialized, engage in extensive performance measurement, and rely on cross functional teams to formulate procurement strategy yet decentralize operational decision-making. Rich and Hines (1998) argue that in many cases procurement may have focused on gaining strategic status rather than on supporting organizational strategy and that the design of procurement should start from organizational strategy progressing to process and structure and only as a final step to the definition of roles and responsibilities. Kotteaku and colleagues suggest that product complexity is one critical determinant of the structure of procurement organizations (Kotteaku, Laios and Moschuris, 1995). When firms encounter the procurement of complex products they need to combine a large amount of technical and financial information and design more complex specifications. Other studies have tried to link different dimensions of procurement structure such as formalization, centralization, or organization in dedicated units with product type (Laios and Xideas, 1994, Xideas and Moschuris, 1998). Johnson and Leenders (Johnson and Leenders, 2001) suggest that procurement organization is often driven by broader corporate organizational change initiatives and that one of the key challenges for Chief Procurement Officers is to understand how to achieve procurement goals under changing organizational structures and the ever changing directions of these corporate initiatives.

Also a strategy of global sourcing has implications for the design of procurement organizations. Global sourcing requires integration of procurement across geographies and therefore suggests an internationally coordinated geocentric organization (Kotabe and Omura, 1989) and the reduction of the decision autonomy of divisions and subsidiaries. Similarly, Trent and Monczka (2003) identified organizational design features used by firms engaging in global sourcing strategies. Such organizations use, for instance, regular strategy reviews and coordination sessions with worldwide procurement managers, leverage international procurement offices, and implement global sourcing processes. Hartmann and colleagues draw upon information processing arguments to develop a contingency theory of control mechanisms in international procurement. Specifically they suggest that the application of different control mechanisms in global procurement are contingent upon the corporate organizational structure and the distribution of procurement expertise among subsidiaries (Hartmann et al., 2008).

3.4 Procurement Performance

Given the increased strategic importance and broader responsibilities of procurement, conceptualizing procurement performance is becoming increasingly important. However research suggests that the conceptualization and measurement of performance in procurement continues to be underdeveloped (Easton et al., 2002).

Ideally, procurement performance should reflect procurement's contribution to corporate wide performance goals (Carr and Pearson, 1999, Carr and Smeltzer, 1999). However, research and to some extent practice have often found it difficult to establish a direct link between procurement activities and broad corporate performance measures (Ellram et al., 2002, Hartmann et al., 2012, Schiele, 2007). As a result a broad variety of procurement specific performance measures have been proposed and studied.

Dumont (1991) and Anderson and Chambers (1985) identify four types of performance measurement systems: naïve performance measurement; efficiency oriented; effectiveness oriented; and multiple objectives. Naïve performance measurement specifies no tangible goals but hopes for good performance without such goals (Stanley, 1993).

Traditionally procurement has emphasized efficiency oriented measurement focusing on cost and operating efficiency. In this approach, performance has often been narrowly conceptualized as the cost of the procurement function itself or on the cost of the procured items (Monczka and Carter, 1978, Schiele, 2007). However such measures have been criticized to be focused too much on short-term results, to be based only on financial measures thereby ignoring operations related measures such as quality, and to be backward looking and thereby ignoring the strategic perspective of procurement (Easton, Murphy and Pearson, 2002). In some instances, such cost-savings oriented measurement approaches may counteract the potential strategic contribution of procurement (Nollet et al., 2008).

Effectiveness oriented measurement of procurement emphasizes customer satisfaction, quality of supplier relationships, and overall profit contribution (van Weele, 2014). Such measures focus on the impact of procurement beyond the procurement context and therefore more closely resemble the strategic contribution of procurement. However, they are still limited in their focus on single performance measures.

Measurement systems that draw on multiple objectives typically use a combination of efficiency and effectiveness oriented measures (van Weele, 2014). While measurement systems have rarely been used in academic research given their complexity (Shao et al., 2012), such measurement systems are more common in practice. For instance, procurement has frequently adopted variations of the Balanced Scorecard (Kaplan and Norton, 1996). Drawing upon operations management research, Gonzalez-Benito (2007) proposes to measure procurement's performance along the dimensions of cost, quality, flexibility, and delivery. This set of criteria has been further expanded by Krause, Pagell and Curkovic (2001) that suggest to add innovation as a fifth dimension for procure-

ment. More recently, Shao and colleagues suggest an alternative system that includes corporate financial performance, cost saving, contribution to sales increase, reduction of working capital and reduction of supply risk (Shao, Moser and Henke, 2012).

3.5 Structure and procurement performance

A small stream of research has linked procurement organizations to different outcome and performance measures. Early research suggested that highly structured procurement organizations tend to focus on efficiency and low cost as their key performance measure whereas less structured procurement organizations emphasize flexibility and the ability to adapt to changing requirements (Kotteaku, Laios and Moschuris, 1995).

Drawing upon the configurational approach discussed above, Cousins and colleagues identify four configurations of procurement organizations based on their level of involvement in strategic planning, their status in the eyes of top management, the degree of internal integration, and procurement skills (Cousins, Lawson and Squire, 2006) and suggest that these configurations lead to significant differences in supplier and organization-wide performance outcomes (Cousins, Lawson and Squire, 2006).

In contrast, focusing on the underlying dimensions of procurement organizations, in a conceptual paper Stanley (1993) suggests that centralization, formalization, complexity and specialization, as well as reward and measurement systems are antecedents of procurement performance. Sanchez-Rodriguez and colleagues show that standardization of materials and standardization of procurement procedures can have a positive impact on procurement performance and ultimately business performance (Sánchez-Rodríguez et al., 2006). Standardization of materials provides reduced procurement cost, low inventory levels, and improved supplier delivery performance. Standardization of procurement procedures increases effectiveness and efficiency of the procurement process and frees time of procurement managers for non-routine activities (Sánchez-Rodríguez, Hemsworth, Martínez-Lorente and Clavel, 2006).

Finally Trent (2004) suggests that organizational design of the procurement organization is central to effectiveness of the procurement organizations. Trent (2004) identifies several insights for the design of the procurement organizations. The placement of the chief procurement officer in the organizational hierarchy is important for the effectiveness of the procurement organizations. This placement provides visibility, access to resources and allows the chief procurement officer to interface with other executives on par. Trent (2004) further identified a gradual shift toward centrally coordinated or centrally led procurement organizations, the use of self-managed and cross functional teams, and the increased trend towards co-location of procurement personnel, and an increased involvement of procurement in the definition of products and services are important trends in procurement.

While the research on organizational design of procurement activities is complex, we may conclude at least that organizational design of the procurement

function affects procurement activities and thereby likely also procurement's contribution to firm performance (Glock and Hochrein, 2011, Tirimanne and Ariyawardana, 2008).

4. Exploration, Exploitation and Ambidexterity

Whereas prior research in procurement has been relatively silent about how organizations can resolve the potential trade-offs emerging from the broader range of strategic goals that strategic procurement implies and that pose conflicting demands on the organization (Schiele, 2010), this topic has received substantial attention in organization theory under the headings of balancing exploration and exploitation and organizational ambidexterity (see, for instance, Lavie, Stettner and Tushman, 2010, Raisch, Birkinshaw, Probst and Tushman, 2009, Turner, Swart and Maylor, 2013 for recent reviews). In this chapter, I first briefly review the organization theoretic literature on balancing exploration and exploitation and organizational ambidexterity. I then conceptualize exploration and exploitation in procurement. In the final section of this chapter I then review the potential applicability of different mechanisms of organizational ambidexterity to the procurement context.

4.1 Balancing exploration and exploitation

Organization theoretic research on exploration and exploitation and their balance suggests that exploration and exploitation involve fundamentally different activities that would suggest very different management approaches supporting each activity and that lead to outcomes differing along important dimensions such as timing or variance (Uotila et al., 2009). Exploitation activities are geared towards incrementally developing and refining existing activities that the organization already engages in and rely on existing knowledge and routines in doing so. In contrast, exploration activities involve innovation and novelty and often depart from existing activities. As a result exploration activities often require novel knowledge and may lead to new routines. The differences between exploitation and exploration activities are also reflected in their risk-return profile. Exploitation activities lead to temporally proximate and relatively certain returns.

While in many situations a trade-off would seem to exist between exploration and exploitation in terms of resource allocation and management approach, the benefits deriving from these activities are at least over time complementary and

latest since the seminal study by March (1991) we know that optimal performance derives from maintaining a balance among exploration and exploitation (He and Wong, 2004, Uotila, Maula, Keil and Zahra, 2009). Organizations that overemphasize exploitation at the expense of exploration become trapped in increasingly obsolete capabilities and therefore may fail to adapt to changes in the environment (Levinthal and March, 1993, March, 1991). Organizations that overemphasize exploration at the expense of exploitation may never reap the rewards of the experimentation activities they engage in. In support of this insight a number of studies has shown theoretically and empirically that balancing exploration and exploitation leads to optimal performance (Gibson and Birkinshaw, 2004, He and Wong, 2004, Lubatkin et al., 2006, March, 1991, Uotila, Maula, Keil and Zahra, 2009). However, achieving a balance of exploration and exploitation is challenging for organizations given that not only trade-offs exist in the focus and reward structure of exploration and exploitation, but fundamentally different activities and organizational capabilities are needed to achieve exploration and exploitation and frequently these activities may be incompatible.

4.2 Organizational Ambidexterity

Given the difficulty of balancing exploration and exploitation, a large research stream has emerged that has identified antecedents to the balance of exploration and exploitation. Research in this stream of literature has identified several modes how organizations cope with the trade-offs and tensions between exploration and exploitation. These modes can be broadly separated in approaches that draw upon separation of exploration and exploitation activities (either in organization, time, or domain) and those that aim to achieve a balance without separation by creating a context that allows for simultaneous exploration and exploitation in the same organizational unit and domain (contextual ambidexterity). Organizational ambidexterity and its organizational modes should be understood as an organizational capability (O'Reilly and Tushman, 2008) that is antecedent to the outcome of balancing between exploration and exploitation.

Structural separation. The most widely discussed mode of ambidexterity is structural separation (Cao et al., 2009, He and Wong, 2004, Jansen et al., 2009, Tushman and O'Reilly, 1996). Structural separation resolves the tension between exploration and exploitation activities by creating distinct organizational units dedicated to each activity. Examples for ambidexterity through structural separation are new venture divisions where the operating divisions focus on efficiency in existing businesses whereas the new venture division focuses on experimentation with novel business ideas (Burgelman, 1985, Burgers et al., 2009). More recent research has emphasized how the separation between exploration and exploitation may occur across different hierarchical levels (Lubatkin, Simsek, Ling and Veiga, 2006, Smith and Tushman, 2005).

The advantages of structural separation of exploration and exploitation in separate units is based on the fact that each unit can maintain internal consistency in tasks, culture, processes and routines, control systems, and incentive structures (Tushman and O'Reilly, 1996). However, the strict separation necessitates the creation of dedicated coordination and integration mechanisms (Jansen, Tempelaar, van den Bosch and Volberda, 2009) among the differentiated units often on the level of the top management team. Thus also under structural separation the challenge of simultaneously managing exploration and exploitation remains. However, it is concentrated in a relatively small group of managers. These managers need to recognize, reconcile and synchronize the conflicting pressures arising from exploration and exploitation (Andriopoulos and Lewis, 2009, Smith and Tushman, 2005) and create effective mechanisms to deal with them within a group context (Simsek et al., 2009).

Temporal separation. Temporal separation achieves ambidexterity by giving up the simultaneous pursuit of exploration and exploitation activities and replacing it with a sequential focus of attention and resources on either activity over time (Boumgarden et al., 2012, Brown and Eisenhardt, 1997, Gulati and Puranam, 2009, Lavie, Stettner and Tushman, 2010, Nickerson and Zenger, 2002). Organizations achieve balance over time by temporarily focusing on exploration and then shifting to exploitation and vice versa thereby avoiding to deal with conflicting demands at any given point in time. By the same token, the organization can be considered ambidextrous only over time and at any given point in time would appear to the observer as unbalanced. The most common pattern of ambidexterity through temporal separation involves long periods of exploitation interspersed with relatively short periods of intense exploration (Simsek, Heavey, Veiga and Souder, 2009) as predicted by the punctuated equilibrium model of organizational change (Gersick, 1991). However, also more gradual patterns have been shown to exist for instance in the context of alliances (Lavie and Rosenkopf, 2006, Rothaermel and Deeds, 2004).

The key challenge in temporal separation lies in managing organizational transition in differing environmental conditions (Siggelkow and Levinthal, 2003). Shifting from exploration to exploitation and vice versa frequently involves major changes in management systems such as formal structure, routines and practices, systems of reward and control, and resource allocation systems (Simsek, Heavey, Veiga and Souder, 2009). Such a transition may be particularly difficult given that focus on exploration or exploitation may create a stronger path dependence (Benner and Tushman, 2003, Levinthal and March, 1993) and inertia to change to the other type of activity (Audia et al., 2000).

Domain separation. The third separation mode, domain separation (Lavie et al., 2011, Lavie and Rosenkopf, 2006), is based on the idea that balance between exploration and exploitation may involve separating exploration and exploitation into different domains, that is discrete fields of organizational activity such as for instance alliances, new product development, and production (Lavie, Kang and Rosenkopf, 2011). Domains are not necessarily tightly mapped

onto particular organizational units and therefore, for instance, the same organization may engage in the domain of new product development in exploration focusing on particularly novel and innovative technologies while emphasizing exploitation in the domain of production thereby focusing on tried and tested production methods. In a recent study of domain separation, for instance, Lavie and colleagues (Lavie, Kang and Rosenkopf, 2011, Lavie and Rosenkopf, 2006) distinguish for strategic alliances between the function domain (specifically distinguishing knowledge generating from knowledge leveraging alliances), the structure domain (new versus prior partners), and the attribute domain (similar versus dissimilar partners).

In domain separation, organizations do not reconcile exploration and exploitation within each domain but rather balance these activities across different domains. Lavie and colleagues (Lavie, Kang and Rosenkopf, 2011) suggest that domain separation may allow to avoid at least some of the inherent trade-offs that arise from temporal or structural separation. For instance, domain separation may allow relaxing resource allocation constraints that emerge when exploration and exploitation are being pursued simultaneously within a domain It may further reduce the need for coordination among and even for integrating of inherently conflicting practices that often emerge when exploration and exploitation are being pursued simultaneously within a domain. Finally, domain separation may also be easier to pursue than temporal and structural separation (Lavie, Kang and Rosenkopf, 2011).

Contextual ambidexterity. Some scholars suggest that exploration and exploitation can be balanced by creating an appropriate organizational context that allows managers to simultaneously pursue both exploration and exploitation (Birkinshaw and Gibson, 2004, Gibson and Birkinshaw, 2004, Im and Rai, 2008, Im and Rai, 2014, Simsek, Heavey, Veiga and Souder, 2009, Wang and Rafiq, 2014). Gibson and Birkinshaw (2004: 211) view contextual ambidexterity as an organizational context "that encourages individuals to make their own judgments as to how best divide their time between the conflicting demands" of exploration and exploitation. Instead of structural or processes that balance exploration and exploitation, contextual ambidexterity emphasizes the important role of soft factors such as culture, norms and values.

The ideas of contextual ambidexterity build on the fundamental principle of systems dynamics that the underlying structure of a system determines the behavior of that system (Forrester, 1968, Markides, 2013). This implies that if managers want to achieve a balance between exploration and exploitation in their organization, they need to create an appropriate organizational context for such behaviors to occur. Organizational context herein extends beyond organizational structures and can be understood broadly as the organization's culture, norms, values, processes, practices, and incentives (Markides, 2013).

Specifically, Gibson and Birkinshaw (2004) suggest that an organizational context that allows individuals to balance exploration and exploitation combines stretch, discipline, support and trust. Stretch and discipline herein provide an emphasis on high performance while support and trust provide strong

social support (Ghoshal and Bartlett, 1994). Together these factors facilitate the behavioral capacity of the organization to simultaneously provide coherence among all the patterns of activities in a business unit and the ability to reconfigure activities in response to changing demands in the task environment (Gibson and Birkinshaw, 2004: 209).

Contextual ambidexterity is rooted in an organizational culture that promotes at the same time creativity and discipline and embraces simultaneously the respect for different viewpoints and knowledge and their integration into a cohesive point of view (Eisenhardt and Schoonhoven, 1990, Jelinek and Schoonhoven, 1990, Wang and Rafiq, 2014). Central to an ambidextrous organizational context are norms, values, and beliefs that support balancing the opposing demands of exploration and exploitation by enabling individuals to divide their time between conflicting demands (Gibson and Birkinshaw, 2004, Simsek, Heavey, Veiga and Souder, 2009). Also, organizational practices and routines such as the use of job enrichment, and task partitioning may support contextual ambidexterity (Adler et al., 1999).

Given its emphasis on enabling individuals, contextual ambidexterity facilitates balancing exploration and exploitation by shifting the resolution of tradeoffs from the level of the organization to lower levels, for instance the individual or the group, where these may then be resolved by sequential allocation of attention to divergent tasks (Lavie, Stettner and Tushman, 2010).

4.3 Exploration and exploitation in procurement

In a recent review of the exploration exploitation literature, Lavie and colleagues (Lavie, Stettner and Tushman, 2010) argue that exploration-exploitation patterns may vary across different contexts and that therefore research needs to study exploration, exploitation and ambidexterity in specific contexts. To contribute toward addressing this gap in the literature, I start with conceptualizing exploration and exploitation in more detail for the context of procurement.

In the key concepts section (chapter 1, section 1.5), I defined that exploitation refers to activities that reflect refinement, choice, production, efficiency, selection, implementation, and execution (March, 1991: 71) and are focused on short-term benefits and performance variance reducing outcomes. In contrast exploration refers to activities that reflect search, variation, risk taking, experimentation, play, flexibility, discovery, and innovation and are focused on long-term benefits and performance variance increasing outcomes.

In the context of procurement, exploitation can be understood to incorporate the ongoing sourcing activities related to existing suppliers, products, services, and technologies on the one hand and the implementation and refinement of the procurement organization (including its structure processes and practices) on the other hand. As a result, many day-to-day procurement activities in organizations can be regarded as exploitation. For instance, interactions with existing suppliers are often dominated by a focus on increasing efficiency, reliability, and quality that are best described as implementation and refinement. Also

the sourcing of standard components and services typically reflect such a focus on efficiency and refinement when procurement organizations aim to identify cost effective and reliable suppliers for well specified products and services. Initiatives such as reducing the supplier base or reducing invoices typically reflect exploitation as they are focused on achieving increased efficiency and improved execution of the sourcing of existing products and services.

Also within the domain of the development of the procurement organization, its processes and practices exploitation plays a major role. Unless the procurement organization is highly advanced (Schiele, 2007), much of the organizational development in procurement organizations focuses on consistently implementing existing processes and practices organization wide and refining them to further improve efficiency.

The reason for this emphasis of procurement work on exploitation may be found in the focus on short-term goals such as reducing prices, improving payment terms, and improving the quality and reliability of supply that have dominated the agenda of procurement in the past. As procurement functions in organizations have matured this emphasis has gradually shifted towards a broader agenda that includes a broader range of goals (Ellram and Carr, 1994, Ogden, Rossetti and Hendrick, 2007, Paulraj, Chen and Flynn, 2006) that are better reflected by the term of exploration.

Exploration in procurement can be understood to incorporate the search for and experimentation with new suppliers, new products and services, new technologies on the one hand and the search for organizational innovation on the other hand. As the research on procurement and innovation suggests, the search for and selection of innovative new suppliers is central to facilitate innovation, flexibility and long-term performance (e.g., Pulles, Veldman and Schiele, 2014, Schiele, 2006, Song and Di Benedetto, 2008, Wagner, 2010). Exploration in this context may also include procurement activities that support developing innovations with suppliers and stimulating the innovation activities of suppliers (Aminoff, Kaipia, Pihlajamaa, Tanskanen, Vuori and Makkonen, 2016).

Procurement can move beyond exploitation, when sourcing novel products and services that may enable innovative new products and services in the focal firm. In particular, the sourcing of new technology that is central to the open innovation paradigm is one important instantiation of exploration in procurement as technology sourcing often has substantially higher level of risk, a longer time frame than traditional procurement activities, and possibly higher returns.

A second dimension in which exploration has come onto the agenda of procurement is in terms of organizational innovation (Birkinshaw et al., 2008, Mol and Birkinshaw, 2009). While initially procurement organizations have emphasized the introduction and refinement of core procurement methodologies and processes throughout the organization, increasingly procurement organizations are adding exploration through experimenting with novel procurement approaches including early supplier involvement (LaBahn and Krapfel, 2000, McIvor and Humphreys, 2004, Petersen, Handfield and Ragatz, 2005, Schiele, 2010), e-auctions (Hartley et al., 2006, Hartley et al., 2004), and a broad range

of open innovation approaches like crowd-sourcing, idea tournaments, or product platforming (Chesbrough, Vanhaverbeke and West, 2006, Chesbrough, 2003, Laursen and Salter, 2006, Schiele, 2010). Finally, procurement engages in exploration when participating in the development of novel organizational designs, novel processes and novel management practices. One may argue that challenging the organizational designs, processes and practices are the condition sine qua non for exploration in procurement since they set the requirements for external products and services to be procured and shape the balance between internal activities and outsourced activities.

4.4 Ambidexterity in corporate procurement

In the context of procurement, mechanisms to balance exploration and exploitation have received relatively scant academic attention with the exception of technology sourcing where the need for ambidexterity is maybe the most obvious and where structural separation has been investigated in some research (e.g., Rothaermel and Alexandre, 2009). In this section, I therefore report arguments that emerged from the interplay of insights derived deductively from prior literature with insights derived from fieldwork that I conducted in parallel with my literature study. The detailed findings of the fieldwork while informing are being reported in Appendix 2. A detailed summary of the methodological approach follows in Chapter 7.

Structural Separation. In the procurement function, structural separation may be created, for instance, when new technology sourcing activities are being separated into a distinct unit from the sourcing of mature technologies, products, and services (Schiele, 2010). In many organizations, structural separation may be difficult to achieve given that procurement organizations often are relatively small and at least partly intertwined in their work with other units (Trent, 2004). This makes it difficult to clearly separate exploration and exploitation in different parts of the procurement organization since frequently the critical mass for such separation may be missing. Usually, procurement work is dependent upon close cooperation with other functions in the organization (Johnston and Bonoma, 1981, Song et al., 1997) and therefore the degree of exploration and exploitation may need to be flexibly aligned depending upon with which part of the organization procurement managers are cooperating. A further challenge in this approach may result from the fact that structuring procurement based on exploration and exploitation may not be aligned with overall organizational structuring based on other principles such as required competences, processes used, or the organization units' structures that procurement interfaces with (Glock and Hochrein, 2011). As a result, the procurement structure may become overly complex and overall efficiency may be hampered.

Temporal Separation. To achieve temporal separation in procurement, the procurement organization would have to switch between periods in which it focuses exclusively on exploitation, for instance, the refinement of existing

products, services, and technologies and periods in which it focuses exclusively on exploration for instance through seeking of novel product services and technologies. In practice, temporal separation of exploration and exploitation would seem as a particularly difficult mode of ambidexterity for corporate procurement given that short-term goals such as cost and short-term supply needs and more broadly pressures for efficiency and productivity will always be central to procurement work (Schiele, 2010) and therefore it may be difficult to temporarily put such short term demands on hold while focusing exclusively on exploration. The only feasible approach to introduce higher levels of exploration in an otherwise exploitation focused organization may be very short periods of experimentation and exploration of alternative goals, for instance in the format of dedicated projects. However, to avoid organizational resistance, such periods of exploration would need to be carefully aligned with cycles of exploration and exploitation in the organization at large (Lavie, Stettner and Tushman, 2010). Furthermore, introducing exploration for relatively short periods or within limited projects faces the challenge that the procurement organization may lack the necessary personnel skills and organizational capabilities to successfully execute these (Aminoff, Kaipia, Pihlajamaa, Tanskanen, Vuori and Makkonen, 2016, Wynstra et al., 1999). As a result, external resources such as consultants or a new Chief Procurement Officer with experience in exploration may play a central role to introduce periods of exploration in an otherwise exploitation oriented procurement function.

Domain separation. Domain separation in procurement may be implemented, for instance, by focusing exclusively on exploration in the domain of product, service, and technology sourcing (Rothaermel and Alexandre, 2009) while focusing exclusively on exploitation in the domain of procurement organization development or supplier development (Modi and Mabert, 2007). This may allow corporate procurement to achieve a higher level of ambidexterity while at the same time maintaining a strong focus on goals imposed by the organization at large. However, this presupposes a strong focus on process and practice development in the procurement organization. In addition to the process versus content domain distinction also other domain distinctions may lend themselves as a basis to balance exploration and exploitation across domains. For instance, in high technology industries, product oriented companies' direct procurement may benefit from a stronger emphasis on innovation and novelty (Schiele, 2010), whereas indirect procurement may emphasize efficiency related goals (Ellram, Tate and Billington, 2004). However, in practice domain separation may be difficult to accomplish given that the organizational goals and the degree of organizational development may dictate a balance of exploration and exploitation in each domain.

Contextual ambidexterity. Implementing contextual ambidexterity in the context of procurement would suggest to create an organizational climate in the procurement organization that reflects performance management, trust,

and support which have been suggested as the most central dimensions of contextual ambidexterity (Birkinshaw and Gibson, 2004, Gibson and Birkinshaw, 2004). In the context of organizational procurement, contextual ambidexterity would seem to hold particular promise for several reasons. Given that procurement organizations are often relatively small and need to work tightly integrated with business units (Trent, 2004), managers may simply be forced to operate simultaneously with goals of different time horizons such as the Chief Financial Officer's short term cash conservation goals and the Chief Executive Officer's longer term corporate development needs. Contextual ambidexterity may be a critical enabler that facilitates procurement to accomplish this. Furthermore, procurement organizations may be limited in their ability to achieve ambidexterity through structural separation or even temporal separation, since both the organizational structure and the focus at any point in time may depend on the larger organizational setting the procurement organization is embedded in (Dawes, Dowling and Patterson, 1992, Glock and Hochrein, 2011, Johnston and Bonoma, 1981, Wood, 2005). Finally, the organizational climate and the norms, beliefs, and values it reflects are largely under control of the procurement leaders whereas other mechanisms of ambidexterity are beyond the control of procurement leaders.

At the same time, contextual ambidexterity may not be without challenges. Given the deep embeddedness of procurement in the overall organization, the success potential of contextual ambidexterity may depend upon the degree to which the prerequisites for contextual ambidexterity exist in the organization at large. Furthermore, top level goals of procurement and the associated performance measures are often set externally (Krause, Pagell and Curkovic, 2001) and as a result establishing a set of goals throughout the procurement organization that allows for a balance between exploration and exploitation may be difficult to establish from within the procurement function unless the procurement leader is positioned high enough in the organization to influence the top level goals (Johnson et al., 2006, Johnson, Shafiq, Awaysheh and Leenders, 2014). A third impediment for contextual ambidexterity in procurement results from the fact that procurement managers are often confined to conversation of relative short-term nature unless they are tightly linked into the strategy process (Narasimhan and Das, 2001) and reside sufficiently high in the organization (Johnson, Leenders and Fearon, 2006). For instance, in strategic projects procurement managers may become involved often only at a very late stage when decisions that would allow for exploration have long been made.

Comparison of modes of ambidexterity. A comparison of the different modes of ambidexterity in procurement is summarized in Table 2. From the comparison of different modes of ambidexterity emerges that contextual ambidexterity has the highest potential in the context of procurement and therefore the theory building in the following chapter will focus on this mechanism to foster exploration, exploitation and their balance. In contrast other modes of ambidexterity would seem comparatively more challenging to implement in the context of procurement.

Table 2 Modes of ambidexterity in procurement in comparison

	Structural Separation	**Temporal Separation**	**Domain Separation**	**Contextual ambidexterity**
Key characteristics	Exploration and exploitation occur in different organizational units • Balance across organizational units • Balance at the same time • Balance within the same activity domain	Exploration and exploitation occur at different points in time • Balance within the same unit • Balance over time • Balance within the same activity domain	Exploration and exploitation occur in different activity domains • Balance at the same time • Balance within the same unit • Balance across activities	Exploration and exploitation are balanced through creating suitable organizational context • Balance within the same unit • Balance at the same time • Balance within the same activities
Use in procurement	Separating new technology sourcing from mature technologies	Refinement of existing products followed by focus on novel products and technologies Temporary exploration projects	Exploration in product, service and technology sourcing combined with exploration in procurement organization development or supplier development Direct procurement focuses on exploration while indirect procurement emphasizes exploitation or vice versa	Creating a climate that reflects performance management, trust and support to enable both exploration and exploitation
Assessment	Challenging because • Procurement too small to split • Link to other functions drives balance • Misalignment with overall organization	Challenging because • Ongoing pressure for short-term goals • Organization unable to build necessary personnel skills and organizational capabilities • External resources needed	Challenging because • Ongoing pressure for short-term pressures in all activity domains • Requires strong focus on process and practice development • Degree of organizational development may dictate balance	High promise because • Small size of procurement may facilitate • Dimensions of organizational ambidexterity under control of procurement leadership

Part II – Conceptual Framework for the Study

5. Antecedents of Exploration, Exploitation, and Their Balance

In this chapter, I develop predictions regarding organizational antecedents of exploration, exploitation, and their balance in the context of procurement. Given the sparse literature on exploration and exploitation in procurement, I combine literature from procurement, organization theory and chose variables from both domains. I further ensured the face validity of the variables and arguments regarding their effects by drawing upon fieldwork that I conducted in parallel with the conceptual work. Following common practice in hypothetico-deductive work, however, I derive the formal hypotheses mainly from prior literature. For the interested reader the results of the fieldwork can be found in Appendix 2.

Specifically, I chose two variables from procurement that have been shown to affect the strategic impact of procurement: Procurement centralization and strategic integration. Procurement centralization would seem a central design consideration that determines the degree of control of procurement leaders over the procurement organization and therefore may strongly affect the extent to which procurement leaders can steer the degree of exploration and exploitation procurement pursues. Strategic integration, would seem central to enable procurement to participate in both short-term and long-term strategic issues. I further chose contextual ambidexterity because my literature review and field work suggested that this mode of ambidexterity may be best suited for the procurement context.

The conceptual model of organizational antecedents of exploration, exploitation, and their balance put forward in this dissertation is depicted in Figure 2. I expect exploration, exploitation, and their balance in procurement activities to be influenced by centralization of the procurement organization, strategic integration of the procurement activities and contextual ambidexterity. In the following sub-sections, I will develop predictions for each of these factors.

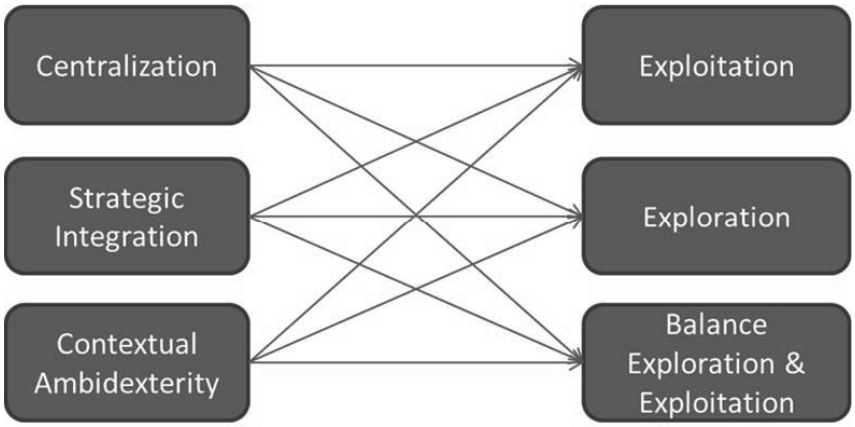

Figure 2 Organizational Antecedents of Exploration, Exploitation, and their Balance

5.1 Centralization of the procurement organization

One of the central choices in the design of the procurement organization and one of the most studied variables in research on procurement organization in general is the degree of centralization (Corey, 1978). For instance, in a recent review of the literature on procurement organization and design, Glock and Hochrein (2011) identify 35 studies that have examined centralization and decentralization of procurement organizations.

Procurement scholars have found different degrees of centralization in procurement organizations being employed (Hartmann, Trautmann and Jahns, 2008) and both centralization and decentralization may have distinct advantages and disadvantages. For instance, while decentralization has the advantage of bringing the procurement activity close to the business that they support, centralization improves coordination, allows for better forecasting and planning, and increases procurement power (Corey, 1978). Prior research suggests therefore that the degree of centralization depends on the extent of common requirements, cost-saving potential, structure of the supply environment, and the nature of supplier relationships (Corey, 1978).

More recently, research and practice have emphasized that the need for synergy is a key driver in determining the degree of centralization. In particular such synergies include economies of information and learning from sharing knowledge and information on suppliers, new technologies, markets, internal users etc.; economies of process from defining common ways of working; and economies of scale from pooling volumes and reducing the number of suppliers (Faes et al., 2000). However, drivers for decentralization such as the need for problem solving capabilities close to the business unit served, the need for cost containment in procurement, and the importance of close relationship with local suppliers continue to be important (Faes, Matthyssens and Vandenbempt, 2000). Faes and colleagues suggest that equally important in the chosen level of centralization and decentralization may be the path in creating the chosen

organization by building coordination step-by-step, the use of confidence building measures in communications, and coordinated conduct toward suppliers (Faes, Matthyssens and Vandenbempt, 2000).

In relation to exploration, exploitation and their balance, I expect centralization to be particularly influential in fostering exploration in procurement. To achieve long-term goals in procurement such as standardization of technologies or systems used throughout all parts of the corporation often requires coordination across multiple projects that may be spread over different organizational units. In a decentralized procurement set up, such coordination is often difficult if not impossible because information necessary for coordination and even decision-making power may reside with lower-level employees that often lack the understanding and appreciation of the broader organization necessary to coordinate across individual projects and spot the necessity for organization-wide coordination and may even lack the incentives to do so (Mihalache et al., 2014, Sheremata, 2000). Furthermore, centralization of procurement activities may create the critical mass of procurement resources that is necessary to set aside at least some time and attention on long-term projects within the never ending stream of short-term requests arising from stakeholders that procurement is serving. In contrast in decentralized procurement settings, any unallocated time or resources are likely to be allocated to other needs of the business units within which the procurement managers are embedded in, and procurement ends up to do administrative or back-office work. It is not uncommon to see that hundreds of individuals allocate 5-20% of their time to procurement and the rest to other tasks.

In addition to facilitating exploration I expect centralization to also facilitate focus on exploration, though the support from prior research is less clear cut. Some prior research (e.g., Faes, Matthyssens and Vandenbempt, 2000) suggests that centralization may make exploitation more difficult because centralized procurement organizations are often less closely integrated with the business units they serve and therefore may be less focused on supporting the short-term requirements of these business units.

However, a larger literature suggests positive effects of centralization on exploitation. Centralization of procurement allows the organization to leverage corporate volumes in procurement and economies of scale thereby supporting short-term related savings goals (Mena et al., 2014). Centralization is further associated with efficiency in the procurement process (Cavinato, 1991, Glock and Hochrein, 2011) and may also support exploitation through standardized procurement practices and a uniform procurement strategy that facilitate the continuous development of supplier relationships (Arnold, 1999).

Finally, a key role of centralization may be to facilitate balancing exploration and exploitation. As I discussed above, one of the main challenges in balancing exploration and exploitation is that they create demands on the procurement organization that may be difficult to fulfill simultaneously. For instance, focusing on short-term savings may force the procurement organization to forgo projects that require substantial organizational transformation or to forgo investing time in project with uncertainty of success. On the other hand, focus on long-

term improvement may require the organization to forgo short-term savings opportunities to be able to invest, transform processes and structures that may have a bigger long-term impact. As a result, a simultaneous focus on exploration and exploitation often creates tensions and trade-offs for decision-making. Research by Sheremata (2000) suggests that centralization supports managing such strategic trade-offs because it supports coordination and the resolution of conflicts by concentrating decision power centrally. Centralization may also be important for the balance between exploration and exploitation given that procurement traditionally has focused on short-term goals, exploitation may drive out exploration in procurement and mechanisms may be needed that tilt the balance more strongly towards exploration.

Hypothesis 1a: Centralization of procurement activities is positively related to exploration in procurement activities.

Hypothesis 1b: Centralization of procurement activities is positively related to exploitation in procurement activities.

H*ypothesis 1c:* Centralization of procurement activities is positively related to the balance of exploration and exploitation in procurement activities.

5.2 Strategic integration of procurement activities

Research on strategic procurement suggests that superior procurement performance is more likely when procurement is strategically integrated within the organization. Following Narasimhan and Das (2001: 593) procurement's strategic integration "refers to the integration and alignment of strategic purchasing practices and goals with that of the firm". Strategic integration requires that the procurement function is tightly integrated into the business strategic planning process (Gonzalez-Benito, 2007). Strategic integration has often been conceptualized and measured in the literature through related constructs such as strategic procurement (e.g., Carr and Pearson, 1999, Carr and Pearson, 2002, Carr and Smeltzer, 1997, Carr and Smeltzer, 1999, Chen, Paulraj and Lado, 2004, Paulraj, Chen and Flynn, 2006) or procurement integration (Narasimhan and Das, 2001). When procurement managers participate in the strategic planning process it is more likely that the objectives and plans of procurement are aligned with the broader corporate strategy and that ultimately procurement activities support the broader direction of the corporation.

Without strategic integration the risk that procurement strategies and operational plans are not consistent with business and corporate strategy is higher. In the absence of strategic integration procurement becomes less able to identify and develop the functional goals that best support business and corporate strategy (Gonzalez-Benito, 2007).

However, strategic integration cannot be taken for granted since recent data from the International Purchasing Survey suggest that even today almost half of procurement personnel perceive that procurement is not well integrated into strategic planning, its performance is still being measured based on operational measures rather than strategic measures and as a result procurement is mostly focused on short-term issues (Knoppen and Saenz, 2015).

Given its importance in integrating procurement activities into the overall strategy of the firm and in line with prior research on ambidexterity (O'Reilly and Tushman, 2008), I expect strategic integration to be positively related to exploration, exploitation, and their balance. Strategic integration is likely to increase procurement's focus on long-term goals and innovation that is exploration. Participating in strategy processes and projects with longer term time horizon that are often part of the strategy process simply makes procurement personnel more aware of corporate wide strategic plans and allows the procurement organization to contribute to shaping and implementing these plans.

Strategic integration will also allow the procurement organization to be tightly integrated in high priority strategic projects thereby maintaining a tight focus on the shorter-term strategic priorities of the corporation. Being part of the strategy discourse in the corporation enables procurement to prioritize projects and thereby orient its activities to those projects that will deliver the highest value for the corporation. Without tight integration into strategic decisions, procurement is simply limited in its ability to participate in and deliver substantial impact in the corporation and will exhibit no focus.

Finally, I expect strategic integration to be particularly important to achieve a balance between exploration and exploitation in procurement. The key goal of strategic integration is to connect procurement to the strategic discourse among senior management on how to prioritize activities and how to resolve the trade-offs among different corporate goals. Only by being tightly integrated into this strategic discourse, which is not limited to the formal strategy process and in some corporations may even be mostly disconnected from it, procurement can strike a sensible balance between short term strategic priorities and innovation and long-term projects that have the potential to transform the corporation. Strategic integration is instrumental to provide the necessary information that allows procurement personnel to manage the trade-offs between short-term and long-term goals that are necessary to balance between exploration and exploitation.

Hypothesis 2a: Strategic integration of procurement activities is positively related to exploration in procurement activities.

Hypothesis 2b: Strategic integration of procurement activities is positively related to exploitation in procurement activities.

Hypothesis 2c: Strategic integration of procurement activities is positively related to the balance of exploration and exploitation in procurement activities.

5.3 Contextual ambidexterity

Pursuing exploration and exploitation in the same organization creates the need for trade-offs because each activity competes for resources, may require different prioritization, and more broadly is linked to a different management approach (Simsek, Heavey, Veiga and Souder, 2009). Despite the trade-offs between exploration and exploitation, some research on ambidexterity suggests that rather than by separating these activities, organizations may be able to balance exploration and exploitation by creating an organizational context that nurtures both types of activities.

This idea of contextual ambidexterity has its roots in the seminal study by Gibson and Birkinshaw (2004) that argued that rather than by separating exploration and exploitation, an organization can achieve organizational ambidexterity through a combination of contextual attributes can facilitate simultaneous exploration and exploitation. Creating an organizational context that is a set of norms, values, incentives, processes and practices can enable procurement managers to simultaneously respond to the conflicting demands of exploration and exploitation. Instead of relying on structural factors to balance exploration and exploitation, contextual ambidexterity emphasizes the important role of soft factors often also referred to as an organizational climate and underline the important role of managerial leadership.

Such contextual ambidexterity may be particularly relevant for supporting exploration and exploitation in their balance within the procurement organization since the locus of balance for this form of ambidexterity resides at the individual and group level rather than at the organizational level as typically is the case in all other approaches to balancing exploration and exploitation (Lavie, Stettner and Tushman, 2010). As a result contextual ambidexterity is the only mechanism of balancing exploration and exploitation that has also been investigated below the corporate level in the context of research and development (Chang et al., 2009, McCarthy and Gordon, 2011, Ramesh et al., 2012, Wang and Rafiq, 2014).

Gibson and Birkinshaw (2004) argue that the creation of an appropriate organizational context consisting of structural elements, culture and climate of an organizational unit can foster desired behaviors of the unit's members. Specifically, drawing upon earlier work of Ghoshal and Bartlett (1994) they argue that four attributes are central to balancing exploration and exploitation within an organizational unit: discipline, stretch, support, and trust. Discipline in the form of clear performance and behavioral standards and their application in performance feedback, awards and sanctions provides unit members incentives to meet both short-term and long-term goals. Stretch refers to shared and ambitious objectives that give meaning to reaching these goals. These two dimensions have often been integrated in empirical research towards a common performance management dimensions. Support refers to mechanisms that enable unit members to reach goals. Finally, trust expressed in fair and equal decision processes, activities and staffing creates an environment where unit members cooperate to achieve even seemingly conflicting goals (Ghoshal and Bartlett, 1994, Gibson and Birkinshaw, 2004).

The organizational context elements that Ghoshal and Bartlett (1994) and later Gibson and Birkinshaw (2004) suggest are independently and in combination likely to be antecedents of exploration, exploitation and their balance because they represent universal mechanisms that are independent of the specific goal and can be adjusted to a broad range of goals that the organization may want to pursue. The power of contextual ambidexterity in supporting exploration, exploitation, and their balance in the context of procurement may lie in the fact that organizational ambidexterity does not require structural adjustments in the procurement organization or the organization at large, but may be effective in a broad variety of organizational designs. This may be particularly important given that the overall structure of procurement often may be dictated by the organization structure at large.

HYPOTHESIS 3a: Contextual ambidexterity of procurement activities is positively related to exploration in procurement activities.

HYPOTHESIS 3b: Contextual ambidexterity of procurement activities is positively related to exploitation in procurement activities.

HYPOTHESIS 3c: Contextual ambidexterity of procurement activities is positively related to the balance of exploration and exploitation in procurement activities.

6. Performance Consequences of Exploration, Exploitation, and their Balance

My predictions regarding the performance implications of exploration, exploitation, and their balance are depicted in Figure 3. Specifically, I expect exploration, exploitation and their balance to have distinct influences on procurement performance.

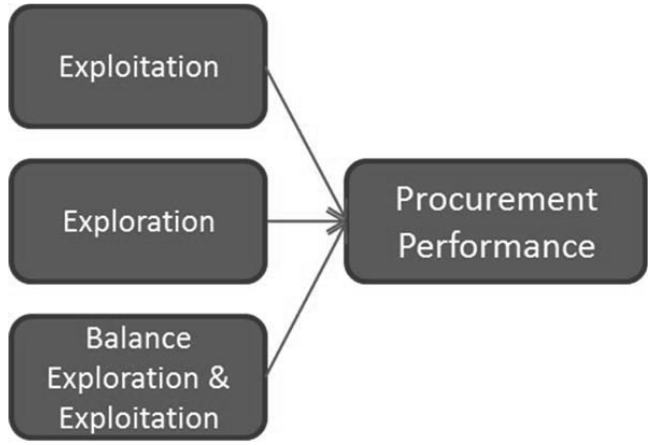

Figure 3 Performance Consequences of Exploration, Exploitation, and their Balance

To understand the effect of exploration, exploitation and their balance on procurement performance it is necessary to reflect on the concept of procurement performance. Dumont (1991) and Anderson and Chambers (1985) identify four types of performance measurement systems that have been discussed: efficiency oriented; effectiveness oriented; multiple objectives; and naïve performance. Naïve performance measurement does not specify tangible goals but hopes for good performance without such goals (Stanley, 1993).

Traditionally procurement has emphasized efficiency oriented measurement focusing on costs and operating efficiency. In practice, many organizations con-

tinue to measure procurement performance focusing on the cost of the procurement function itself relative to the cost of the procured items and the savings that can be achieved regarding these cost (e.g., Easton, Murphy and Pearson, 2002, Ellram, 1995, Ferrin and Plank, 2002, Wouters et al., 2009). However, such a conceptualization is focused too much on short-term results, with its focus on simple financial measures ignores operations related measures such as quality, and by focusing backward ignores procurements potential strategic impact (Easton, Murphy and Pearson, 2002).

Given the short comings of efficiency oriented measurement, scholars have proposed effectiveness oriented measurement of procurement that emphasizes customer satisfaction, quality of supplier relationships, and profit contribution (Dumond, 1991). However also an effectiveness oriented approach to procurement performance falls short to capture all the dimensions of the impact of procurement and therefore more recently scholars and practitioners suggest measurement systems that draw on multiple objectives using a combination of efficiency and effectiveness oriented measures. Such a more strategic perspective on procurement performance that I adopt here may start from viewing performance as a multidimensional construct along the five dimensions commonly used in operations strategy, namely cost, quality, delivery, flexibility, and innovation (Gonzalez-Benito, 2007, Krause, Pagell and Curkovic, 2001). Such a broader conception of procurement performance includes both relatively short-term goals (e.g. cost, quality, or delivery performance) and longer term goals (e.g., flexibility and innovation).

6.1 Exploration and procurement performance

Exploration and exploitation provide fundamentally different performance benefits to the procurement organization (Lavie, Stettner and Tushman, 2010). Exploration focus suggests that procurement organizations emphasize long-term oriented activities that include experiementation, innovation, learning search, and variation (Lavie, Stettner and Tushman, 2010, March, 1991, Uotila, Maula, Keil and Zahra, 2009). Exploration focus introduces variety through search and experimentation helping procurement organizations to develop new knowledge and create those capabilities necessary to provide value to the organization in the long run. For instance by experimenting with new product technologies, procurement organizations may facilitate the development of new products (Rothaermel and Alexandre, 2009). Exploration focus in procurement activities is also likely to lead to more novel products and services being sourced thereby supporting the long-term competitive advantage of the corporation.

Focus on exploration may also be instrumental to align procurement organizations with the long-term priorities of the business units thereby enabling it to support strategic projects with the highest value creating potential. Procurement organizations that focus on exploration further tend to experiment with novel procurement practices and processes thereby potentially improving procurement efficiency and increasing the likelihood of introducing innovation to the organization at large beyond procurement itself. For instance, approaches

such as early supplier involvement (LaBahn and Krapfel, 2000, McIvor and Humphreys, 2004, Petersen, Handfield and Ragatz, 2005, Schiele, 2010), e-auctions (Hartley, Lane and Duplaga, 2006, Hartley, Lane and Hong, 2004), and a broad range of open innovation approaches (Laursen and Salter, 2006, Schiele, 2010) may play an important role in both improving procurement efficiency and improving procurements effectiveness in sourcing innovation. Finally, exploration may add to procurement performance by identifying solutions that increase the flexibility of the procurement organization as well as the flexibility of the organization at large.

While exploration focus provides distinct performance contributions, one needs to also acknowledge that exploration focus has its costs and these cost limit the overall contribution of exploration focus to procurement performance. Focusing on long-term goals may come at the expense of short term benefits related to short-term savings or reduced quality and reliability arising from experimentation and variation (Lavie, Stettner and Tushman, 2010). However, taken together, I expect the procurement organization's focus to exploration to be positively related to procurement performance.

> *HYPOTHESIS 4:* Exploration in procurement activities is positively related to procurement performance.

6.2 Exploitation and procurement performance

Exploitation focus suggests that the organization emphasizes relatively short-term oriented activities that reduce variance, improve productivity and enhance efficiency through execution, refinement, implementation, and production of existing products and services being sourced but also procurement practices and processes, (Lavie, Stettner and Tushman, 2010, March, 1991, Uotila, Maula, Keil and Zahra, 2009).

Exploitation focus may enhance procurement performance by focusing attention on short-term cost-saving opportunities and prioritizing these over longer-term opportunities. Procurement organizations that are focused on exploitation may also emphasize reduced variance in quality for instance by focusing on stricter quality standards and emphasizing quality control and continuous improvement. By focusing on the refinement of existing procurement practices and processes rather than the development of fundamentally new processes, procurement organizations focus on exploitation may also improve quality and delivery reliability. Finally, the short-term focus that is implied by exploitation orientation is likely to improve the adaptation of the procurement organization to the short-term priorities of the organization at large thereby enabling it to create value in the short run.

Analogous to the discussion of the potential cost of exploration, also exploitation focus incurs a cost for the corporation. Focus on short-term improvements may produce negative long-term consequences, since the reduced variance they imply may become a liability over time as the organiaztion does not develop sufficient novelty and change to adapt to a changing environment

(Lavie, Stettner and Tushman, 2010). However, also for exploitation, I expect the combined effect of procurement organization's focus on exploitation to be positively related to procurement performance.

> *HYPOTHESIS 5:* Exploitation in procurement activities is positively related to procurement performance.

6.3 The balance of exploration and exploitation and procurement performance

As the preceding discussion suggests, exploitation activities can be expected to affect procurement performance by facilitating the organization to accomplish those goals that are shorter-term in nature such as cost, quality, or delivery performance. Exploration activities in contrast may be associated more strongly with longer-term goals including innovation and flexibility that require experimentation and the search for novel solutions. In other words, either orientation taken in isolation is incomplete and will not maximize procurement performance. I therefore expect that balancing the two orientations provides an additional procurement performance contribution. This argument is in line with prior research that suggests that balancing exploration and exploitation is positively related to performance although the evidence is mostly on the corporate level and more regarding different mechanisms of balancing the two orientations than are investigated in this dissertation (Gibson and Birkinshaw, 2004, He and Wong, 2004, Jansen et al., 2006, Uotila, Maula, Keil and Zahra, 2009).

Specifically, balancing exploration and exploitation can be expected to provide two distinct performance contributions for the procurement organization. First, balancing exploration and exploitation enables the organization to pursue a wider range of procurement goals simultaneously thereby enhancing procurement performance over and above what a focus on a single orientation could achieve. Second, balancing exploration and exploitation may also help to reduce the cost or address the limitations from either orientation for instance by resolving tensions and trade-offs between exploration and exploitation thereby leading to a more than additive effect.

> *HYPOTHESIS 6:* The balance of exploration and exploitation in procurement activities is positively related to procurement performance.

6.4 Toward an integrated conceptual framework

While I developed separate models regarding procurement behavior and implications for performance, it would seem logical to combine the two sets of predictions into a common theoretical framework. Figure 4 depicts the integrated framework of the relationship between organizational antecedents of exploration and exploitation, the resulting orientation to exploration, exploitation and their balance and their performance implication for procurement activities and Table 3 summarizes the associated hypotheses.

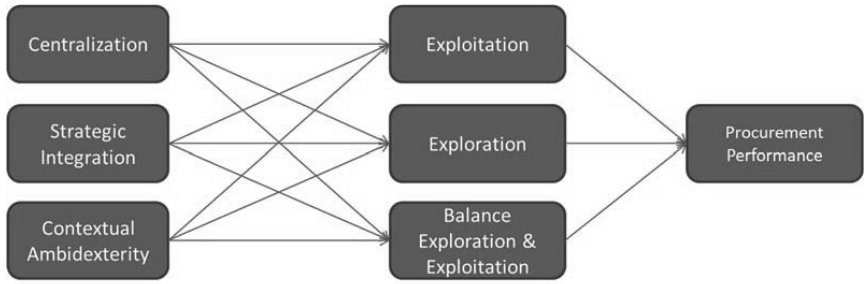

Figure 4 Integrated theoretical framework

Central to the integrated framework is the idea that procurement leaders can influence the levels of exploration, exploitation and their balance by designing procurement structure through procurement centralization, by tying procurement with company-wide strategic processes through strategic integration, and by creating a favorable organizational context in the procurement organization through contextual ambidexterity. These mechanisms allow the procurement leaders to flexibly adjust the organization to respond to the desired level of exploration and exploitation and thereby positively affect performance. By focusing on the three variables discussed in the behavioral model the organization is enabled to balance exploration and exploitation. In line with existing theory on exploration and exploitation (He and Wong, 2004, March, 1991, Uotila, Maula, Keil and Zahra, 2009), such balancing between exploration and exploitation should enhance performance of the organization (Kristal et al., 2010). In other words we may view exploration, exploitation and their balance as mediators between the design variables and procurement performance.

Table 3 Summary of hypotheses

Behavioral model	Hypothesis 1a: Centralization of procurement activities is positively related to exploration in procurement activities. Hypothesis 1b: Centralization of procurement activities is positively related to exploitation in procurement activities. Hypothesis 1c: Centralization of procurement activities is positively related to the balance of exploration and exploitation in procurement activities. Hypothesis 2a: Strategic integration of procurement activities is positively related to exploration in procurement activities. Hypothesis 2b: Strategic integration of procurement activities is positively related to exploitation in procurement activities. Hypothesis 2c: Strategic integration of procurement activities is positively related to the balance of exploration and exploitation in procurement activities. Hypothesis 3a: Contextual ambidexterity of procurement activities is positively related to exploration in procurement activities. Hypothesis 3b: Contextual ambidexterity of procurement activities is positively related to exploitation in procurement activities. Hypothesis 3c: Contextual ambidexterity of procurement activities is positively related to the balance of exploration and exploitation in procurement activities.
Performance model	Hypothesis 4: Exploration in procurement activities is positively related to procurement performance. Hypothesis 5: Exploitation in procurement activities is positively related to procurement performance. Hypothesis 6: The balance of exploration and exploitation in procurement activities is positively related to procurement performance.

Part III – Empirical Analysis

7. Methods

This chapter discusses the key methodological choices I made in this dissertation. First, I describe the exploratory fieldwork I conducted and key choices related to it. Next, I describe the population and sample selection. The third section describes key choices regarding the survey I conducted. The fourth section describes statistical methods I employed to analyze the survey data. The remaining three sections describe the approach to operationalizing the theoretical constructs as well as the specific variables used to test the hypotheses in the behavioral model and in the performance model.

7.1 Exploratory Field Research

In the first stage of the research, parallel to the theory-driven deductive work, I carried out a number of exploratory field interviews. Given that the necessity to balance exploration and exploitation in procurement emerged relatively recently, I felt that efforts to understand the phenomenon in organizational practice and beyond my personal experience as a procurement practitioner were a necessary pre-requisite to strengthen my theorizing. Thus, I engaged in semi-structured interviews with procurement practitioners. Goal of these interviews was to ground my theory development in real world empirical data and thereby ensure the face validity of the theory drive deductive work. This struck me as particularly important since my research transferred organization theoretic construct, that often operate on the firm level of analysis to the context of procurement and the organizational unit level of analysis. To conceptualize exploration and exploitation in the context of procurement required that I iterated between emerging theoretical ideas regarding the conceptualization of the theoretical constructs on the procurement level of analysis and the relationship among the constructs and real world examples for the emerging conceptualization in the procurement context.

Altogether 13 semi-structured interviews were carried out with senior leaders in procurement in Finland and Switzerland. Interviewees worked in large organizations representing a variety of industries including pharmaceuticals, specialty chemicals, retail, banking, engineering and manufacturing, and steel. Interviews lasted between 30 minutes and 1.5 hours and focused on the extent that procurement affects corporate performance beyond short-term savings and

how procurement organization enables value creation beyond short-term savings. As is typical for exploratory research, interviews followed a semi-structured interview guide that provided for a range of topics to be covered in the interview but gave the interviewee enough room to emphasize different topics depending on own experience and interest. The semi-structured interview guide can be found in appendix 1.

All interviews were transcribed and content analyzed for common topics emerging. Following a mostly hypothetico-deductive process, these topics were then compared with the topics arising from the deductive theory building and used to refine the theoretical constructs from the perspective of face validity and practical relevance. The combination of deductive theorizing with these interviews allowed me to ensure that the research topics to be included in the quantitative survey are not only rigorously derived from prior theory but are also of practical relevance. While the results of the fieldwork in fact informed the conceptualizations presented throughout the dissertation and in particular helped to refine the conceptualizations of exploration and exploitation in procurement, following a hypothetico-deductive logic, the main results of the preliminary fieldwork are summarized in Appendix 2.

7.2 Population and sample

For this study I created a sample of large industrial firms in Finland and Switzerland. To create the initial sample of firms to be contacted, I identified for both countries private firms in the Bureau van Dijk Orbis database. The Bureau van Dijk Orbis database contains basic financial and contact information of private companies worldwide.

Companies were initially identified using the following selection criteria:

- Incorporated in Finland or Switzerland
- Revenues over €100 million

For the companies matching these criteria, procurement managers were identified through web searches from the Bureau van Dijk Orbis database, company websites, and social networks (e.g. LinkedIn, Xing). As a result, respondents were identified in 311 firms in Finland and 156 firms in Switzerland adding to a total sample of 467 firms.

7.3 Survey

Questionnaire. Drawing upon the theoretical model developed through deductive theorizing and the topics emerging from the qualitative interviews, I developed an online survey instrument consisting of several sections. In creating this instrument it was necessary to manage the trade-off between collecting the necessary information while limiting the length of the questionnaire and at the same time maintain the cooperation of very busy respondents (Baker, 2003). In creating and administering the survey instrument, I also drew on recent insights from the Tailored Design Method, developed by Dillman and col-

leagues (Dillman et al., 2014). In the first section, I asked respondents for background information about themselves and the company they work for. The second section asked questions about goals and strategy of the firm at large and the procurement organization in particular. The third section contained questions on the company performance and procurement performance. The fourth section covered several dimensions related to the procurement organization. The fifth and final section focused on questions related to organizational and procurement practices.

The questionnaire was pre-tested with several experts on the research domain. These experts were asked to advice on the relevance and clarity of the questions. In response to the expert feedback several questions were modified and the overall length of the questionnaire was reduced. Moreover, the structure of the online questionnaire was modified to make answering easier.

To ensure the anonymity of the respondents, neither company name nor respondent's name where asked in the questionnaire. To encourage responses, respondents were offered a summary of the results. To avoid creating a direct link of the request for a summary to individual responses which would have allowed the identification of specific responses, respondents were asked to send an email to the researcher requesting a copy of the report. 27 respondents requested a report.

Mailing Process and Response Pattern. The questionnaire was administered to the respondents by email. In an initial mailing, the email contained a cover letter explaining the purpose of the study and a link to the survey. After two weeks I send a reminder email that again contained the link to the survey. While earlier research tends to recommend a third round of mailing to non-respondents, I refrained from a third mailing since the anonymous nature of the responses did not allow me to distinguish between respondents and non-respondents and sending additional reminders to respondents would have violated the accepted etiquette of business communications.

Of the 467 firms (311 in Finland and 156 firms in Switzerland) 157 responses were received of which 95 responses from firms located in Finland and 62 responses from firms located in Switzerland. The overall response rate is 33.6% (30.5% for firms located in Finland and 39.7% for firms located in Switzerland) which is high for surveys aimed to senior managers. Of the 157 responses 39 responses were dropped due to missing values on a large number of questions. The final sample therefore consists of 118 responses. This reduced sample translates into a response rate of 25.2%.

Table 4 provides an overview of the job designations the respondents hold in their respective companies. Job designations range from operational roles such as buyer and procurement or purchasing manager to senior roles such as head of procurement, vice president procurement, senior vice president procurement, or chief procurement officer and other senior roles contained in the category other. Over 65% of the respondents would be classified as senior management (head of procurement, VP or SVP procurement and other category)

whereas 35% of the respondents would be classified as lower or middle management.

Table 4 Job designation of respondents

Job Designation Respondent	Number of respondents	Percent
Buyer	1	0.8
Procurement/purchasing manager	11	9.3
Sourcing manager	10	8.5
Category manager/Commodity manager	9	7.6
Category group manager	8	6.8
Head of procurement/sourcing	36	30.5
VP/SVP procurement/Sourcing	23	19.5
Other	20	16.6

Non-Response Analysis. Given that the survey was conducted with full confidentiality such that responses could not be traced back to the firm initially contacted, I am unable to directly compare respondents and non-respondents. However, following prior studies that suggest that late respondents tend to be more similar to non-respondents compared to early respondents (Armstrong and Overton, 1977), I tested the difference in the mean across several descriptive variables for early and late respondents. I classified all the responses as late respondents that were received after the email reminder had been sent to all firm initially contacted. Table 5 summarizes the results of two-sample t-tests for firm size and product versus service focus. The analyses suggested no statistical differences among the two groups.

Table 5 Test of difference among early and late respondents

	Early respondents		*Late respondents*				
	Mean	**Std. dev.**	**Mean**	**Std. dev.**	**T**	**Df**	**Sig. (2-tail.)**
Firm Size	3.349	0.099	3.333	0.105	0.11	115	0.91
Product vs. Service focus	0.281	0.056	0.277	0.061	0.04	116	0.97

Table 6 further compares the distribution of early respondents and late respondents across industries. The industry classification herein is based upon the NACE Rev.2 industry classification as commonly used within the European Union (Eurostat, 2008).

Table 6 Distribution of early and late respondents according to industry sector

Industry	*Early respondents* Number of firms	Percent	*Late respondents* Number of firms	Percent	*Total* Number of firms	Per-cent
A - Agriculture, forestry and fishing	0	0.00	1	1.85	1	.8
C – Manufacturing	43	67.19	29	53.70	72	61.0
D - Electricity, gas, steam and air conditioning supply	2	3.13	2	3.70	4	3.4
F – Construction	1	1.56	2	3.70	3	2.5
G - Wholesale and retail trade; repair of motor vehicles and motorcycles	1	1.56	2	3.70	3	2.5
H - Transporting and storage	3	4.69	3	5.56	6	5.1
I - Accommodation and food service activities	0	0.00	1	1.85	1	.8
J - Information and communication	6	9.38	8	14.81	14	11.9
K - Financial and insurance activities	4	6.25	2	3.70	6	5.1
L - Real estate activities	1	1.56	1	1.85	2	1.7
M - Professional, scientific and technical activities	3	4.69	1	1.85	4	3.4
N - Administrative and support service activities	0	0.00	1	1.85	1	.8
Q - Human health and social work activities	0	0.00	1	1.85	1	.8

Missing Value Analysis. In addition to non-responses, also missing values can introduce bias to the data if data is missing systematically (Hair et al., 2010). To examine the data for potential biases arising from missing values, I first examined the overall fraction of data missing for the measurement items used in the hypotheses tests. Overall there are relatively few missing values in the data (4%). A second question is if these missing values occur at random or follow a systematic pattern. I analyzed the missing values for each item and no systematic patterns emerged that would suggest a systematic bias. In the structural equation models that I use for hypothesis testing, I therefore specified the mlmv option when estimating the models. Rather than using listwise deletion of all instances with missing values, this method makes use of all information under the assumption that values are missing at random (Acock, 2013).

Analysis of Common Method Variance. As the next step, I examined the data for common method bias. Since all data was reported by a single respondent using mostly Likert style questions, the risk exists that systematic variance is being introduced by the measurement method. Such systematic variance can bias the estimates during the hypothesis tests by either inflating or deflating the observed relationships (Podsakoff et al., 2003, Podsakoff et al., 2012). Given that there is substantial debate (Brannick et al., 2010, Spector, 2006, Spector and Brannick, 2010) whether common method variance is a topic that should be of substantial concern to the researcher, in this dissertation I chose a relatively simple approach to test for this possibility. Specifically, to test for common method bias, I employed Harman's one-factor test as well as confirmatory factor analysis. In Harman's one factor test, all measurement items are being entered simultaneously into an exploratory factor analysis. Common method variance is thought to be present when a single factor emerges or one factor accounts for the majority of covariance among the variables. I compared

the factor analysis with unrotated principal component, and maximum likelihood factor analysis.

In all both specifications, ten factors emerged with an eigenvalue greater than 1.0, the commonly used cut-off point. The ten factors jointly accounted for 88.1 percent of the total variance. The largest factor accounted for 30.7 percent that is substantially less than half of the variance. In other words, neither of the two critical conditions for a single factor as specified in the Harman one-factor test are fulfilled and common method bias should not be an issue for the hypothesis tests.

As a second test I conducted confirmatory factor analysis with all measurement items loading on one factor. If common method variance were present, the one-factor model should fit the data well (e.g., Korsgaard and Roberson, 1995). The confirmatory factor analysis with a single factor exhibited poor fit with the data (Chi-square = 1553.01 [df= 629], p=0.000; CFI = 0.492; TLI = 0.462; RMSEA = 0.112) providing further evidence that common method bias is not an issue in the present data.

7.4 Statistical Methods

This dissertation employs both descriptive and inferential statistical techniques. First, descriptive analysis is used to provide an overview of the data and identify patterns contained therein. Second, confirmatory factor analysis is used to test the validity of the measures developed to test the theoretical model. Third, ordinary least square regression models and for robustness, structural equation models, are used to test the theoretical models developed in the theory section.

Descriptive analysis. Descriptive analysis is used to describe and summarize the data in a meaningful way and identify emerging patterns thereby facilitating the researcher's interpretation process (Saunders et al., 2009). Descriptive analysis starts from condensing the existing data in univariate analysis by describing its distribution (minimum values, maximum values, kurtosis, and skewness), the central tendency (e.g. mean, median, or mode), and the dispersion of responses (standard deviation of variance) for each variable. Descriptive analysis then may describe the relationship between pairs of variables through cross tabulation's and contingency tables, graphical representations, and analysis of dependence through correlation and covariance analysis.

Despite the important role of descriptive analysis in any data analysis, it is also important to understand its limitations. While descriptive analysis is central to understanding the patterns in the data, it does not allow to make inferences beyond the present data. Such inferences require the use of inferential statistics that use probability theory to make statements beyond the existing data set.

Confirmatory Factor Analysis. While measurement items were selected based on prior theory, confirmatory factor analysis is used to test whether the number of factors and the loadings of measurement items conform to the factor

structure predicted by the theoretical model developed in the previous chapter. The goal of the analysis is to test whether in the present data items load on factors as predicted by the theory.

Confirmatory factor analysis allows to assess the construct validity of the measures used for this study that is it allows to assess the extent to which a set of measurement items reflect the theoretical construct they were designed to measure. The main dimensions of construct validity investigated in this dissertation are convergent validity (tested through factor loadings, variance extracted, and reliability), discriminant validity, and face validity (Carmines and Zeller, 1979).

Confirmatory factor analysis relies on the assumption of multivariate normality. In absence of a test for multivariate normality I investigated skew and kurtosis of the measurement items as recommended in prior literature and found them to be well below the critical thresholds of 2 for skewness and 7 for kurtosis that have been recommended (Curran et al., 1996).

While the study relies on regression analysis as its main method of analysis given the relatively small sample size[1], the confirmatory factor analysis that is carried out as a first step of analysis relies on structural equation modeling (Acock, 2013). As part of confirmatory factor analysis, the researcher examines the overall model fit as well as face validity, convergent validity, discriminant validity and reliability (Garver and Mentzer, 1999).

To assess the overall model fit, a number of goodness-of-fit measures exist. Commonly used goodness-of-fit measures with the commonly used thresholds (Hu and Bentler, 1999, Hu and Bentler, 1995) are summarized in Table 7.

Face validity describes the extent to which the measure developed can be viewed by the researcher as covering the concept it purports to measure. To ensure face validity I relied on an extensive literature review in developing the measures and in particular upon previously tested measures were possible. I further pre-tested the questionnaire with several experienced scholars in the research domain.

Convergent validity denotes the extent to which the items of the scale represent the construct's content. For convergent validity the measures should exhibit positive and statistically significant factor loadings and average variance extracted (AVE) above 0.5. The average variance extracted is given as

$$AVE = \sum_{i=0}^{n} \frac{L_i^2}{n}$$

where L_i is the standardized factor loading of item i, and n is the number of items measuring the construct.

For discriminant validity, the second commonly used criterion of validity, the research needs to establish that measures of different constructs are distinct rather than cross-loading. To this effect research frequently expects the maximum shared square variance (MSV) to be smaller than the average variance extracted,

[1] Despite the insufficient sample size, a structural equation model is being tested as a robustness test. I discuss the results of this robustness tests in section 9.3.

the average shared square variance (ASV) to be smaller than the average variance extracted, and the square root of the average variance extracted to be greater than the inter-construct correlations (Hair, Black, Babin and Anderson, 2010).

Table 7 Commonly used goodness-of-fit criteria in structural equation modeling

Criterion	Description	Commonly used threshold
Chi-square/df	**Sum of squared differences between observed and estimated covariance matrices adjusted for degrees of freedom**	**<3 good; <5 permissible**
p-value for the model	Chi-square test	>.05 recommended
Comparative fit index (CFI)	Proposed model compared with the baseline model without relationships, adjusted by degrees of freedom	>.95 great; >.90 acceptable; >.80 sometimes permissible
Goodness of fit index (GFI)	Predicted squared residuals compared with obtained residuals.	>.90 recommended
Tucker-Lewis Index TLI	Difference in Chi-square/df of proposed model and baseline model divided by Chi-square/df of baseline model minus 1.	values over .90 or over .95 are considered acceptable
Normed Fit Index NFI	NFI equals the difference between the chi-square of the null model and the chi square of target model, divided by the chi-square of the null model	>.90
Root mean square error of approximation (RMSEA)	$\frac{\sqrt{(X^2 - df)}}{\sqrt{[df(N-1)]}}$	<.05 good; .05-.10 moderate; >.10 bad
Standardized root mean square residual SRMR	Stadardized formula of mean absolute value of the covariance residuals	<.09 recommended
Akaike Information criterion (AIC)	Comparative measure of fit when two different models are estimated	Values closer to zero indicate better fit and greater parsimony

In addition to convergent and discriminant validity, the reliability of scales needs to be established. Here, I rely on the two most commonly used measures: Cronbach's Alpha and Composite Reliability (rho). Cronbach's Alpha is a measure of internal consistency of the items that form the measure. Cronbach's Alpha is the lower limit of the true reliability since it assumes that all items have identical centrality (Acock, 2013). Composite reliability (rho) relaxes this restriction. For uncorrelated errors, rho is given as

$$\rho = \frac{(\sum \lambda_i)^2}{(\sum \lambda_i)^2 + \sum \theta_{ii}}$$

Where λ_i is the standardized factor loading of item i and θ_{ii} is the standardized error variance (Garver and Mentzer, 1999, Raykov, 1997).

Multiple Regression Analysis. The main analysis method in this dissertation is multiple regression analysis. The key strength of multiple regression analysis rests on its ability to test the relationship between several independent variables and a single dependent variable with relatively limited requirements regarding sample size and moderate assumptions regarding the underlying data. These two characteristics are central in the present study given the relatively small sample size and other limitations of survey data.

I estimate linear regression of the form $y_i = b_0 + b_1x_1 + b_2x_2 + \ldots b_nx_n + e$ where y represents the dependent variable to be explained, $x_1 \ldots x_n$ are the independent variables used to explain the dependent variable, $b_0 \ldots b_n$ are the regression coefficients of the independent variables and e is the residual that reflects the difference between the actual and the predicted values of the dependent variable.

While a large number of different regression specifications exist, I am using ordinary least squares (OLS) regression, the simplest and most common regression specification. In OLS regression the sum of the squared errors of prediction is minimized to arrive at the regression equation.

OLS regression assumes metric data, linear relationships, a constant error term, independence of the error terms and normality of the error term distribution (Hair, Black, Babin and Anderson, 2010). I tested these assumptions with the present data and found that the data overall meets the requirements of OLS regression allowing for further analysis. While some of the variables diverge somewhat from the normality assumption the divergence was small and in the main analysis untransformed variables are used. This approach is acceptable since OLS is regarded as the best linear, unbiased estimator independent of the distribution of the variables (Kennedy, 2008). For robustness, I experimented with variable transformation and rerun regression with these transformed variables with minimally different results that did not change the interpretation of results (that is results stayed qualitatively similar).

In OLS regression, the researcher tests the significance of the overall model by examining the F ratio that is given as

$$F = \frac{\frac{SSE_{regression}}{df_{regression}}}{\frac{SSE_{total}}{df_{residual}}}$$

where $SSE_{regression}$ is the sum of squared errors, $df_{regression}$ is the number of estimated coefficients including the intercept minus 1, $df_{residual}$ is given as the sample size – the number of estimated coefficients including the intercept (Hair, Black, Babin and Anderson, 2010).

In addition to testing the significance of the overall model, the researcher tests the significance of the regression coefficients. This provides a statistically based probability estimate of whether the estimated coefficients will be different from zero when drawing a large number of samples. In OLS regression the researcher uses the t-statistic that is given by the ratio between the coefficient and the standard error of the coefficient (Hair, Black, Babin and Anderson, 2010).

Structural Equation Modeling. To test the robustness of the regression models as a secondary analysis method I used structural equation models. Structural equation modeling refers to a set of statistical analysis techniques that includes confirmatory factor analysis, path analysis and latent growth modeling among others (Acock, 2013, Bollen, 1989, Schumacker and Lomax, 2010). Structural equation models consist of "a set of linear equations that simultaneously test two or more relationships among directly observable and/or unmeasured latent variables" (Shook et al., 2004: 397).

The central advantage of structural equation models is that it (1) allows to model complex multistage dependence relationships where variables can be simultaneously dependent variables and independent variables, (2) allows to simultaneously examine multiple dependent variables and (3) allows to include unmeasured latent variables in the models (Shook, Ketchen, Hult and Kacmar, 2004).

Structural equation models are strictly confirmatory (Hair, Black, Babin and Anderson, 2010) that is they assume a well-developed set of relationships among theoretical constructs and a well-developed set of measures for these constructs that are being tested. The empirical approach is to use goodness-of-fit tests to determine if the pattern of variances and covariances observed in the data is consistent with the pattern the structural model specified by the researcher would led to expect (Bollen, 1989).

To evaluate structural equation models the researcher progresses in three steps (Hair, Black, Babin and Anderson, 2010). In the first step results are examined for offending estimates. Such estimates include negative arrow variances, standardized coefficients exceeding a very close to 1.0, or very large standard errors. Such estimates may force the researcher to modify the model for instance by eliminating some of the constructs of measurement items (Hair, Black, Babin and Anderson, 2010).

The second step is to assess the overall model fit using multiple goodness-of-fit measures. Commonly used goodness-of-fit measures with the commonly used thresholds (Hu and Bentler, 1999, Hu and Bentler, 1995) are summarized in Table 7 above.

The third step involves the interpretation and potential modification of the model. This involves examination of the results relative to the theoretical model. The central question to be answered is if the proposed relationships are in the correct direction and statistically significant. Interpretation thereby uses the standardized coefficients as these approximate effect sizes and allow the comparison of coefficients in the model though at the cost of being sample specific and not comparable across samples(Hair, Black, Babin and Anderson, 2010).

The power of structural equation model, however, comes at the cost of substantially higher sample size requirements, in particular to test complex models such as the combined model in this dissertation. Common rules of thumb suggest sample sizes of 150-200 as the minimum for a model of the complexity tested here. Given that my sample size is well below this sample size threshold, I chose to use structural equation models only as robustness tests.

7.5 Operationalization of the theoretical constructs for hypotheses tests

This section discusses the operationalization of the theoretical constructs used in the hypotheses developed in the theory section, specifically the selection of measurement items, descriptive statistics, and the results of the confirmatory factor analyses (construct validity and reliability).

Since for most constructs objective measures were not available, I used multi-item Likert scales (Krosnik and Presser, 2010, Likert, 1932) that where either pre-tested scales, or scales based on existing research that were modified for the current study. Unless reported otherwise below, statement style items were used with the scale ranging from 1 = I strongly disagree to 7 = I strongly agree.

The variables of both the behavioral model and the performance model were included in a single confirmatory factor analysis. The resulting model exhibited satisfactory fit with the data (Chi-square = 417.53 [df= 332], p=0.010; CFI = 0.948; TLI = 0.936; RMSEA = 0.047). The detailed results of this analysis are in Appendix 3.

7.6 Variables in the Behavioral Model

The constructs operationalized for the behavioral model (hypotheses 1-3) include

Dependent Variables
- Exploration
- Exploitation
- Balance of exploration and exploitation

Independent variables
- Centralization of procurement activities
- Strategic integration of procurement activities
- Contextual ambidexterity

Control variables
- Focus on procurement goals
- Structural separation
- Country
- Firm size
- Product/service company
- Industry

The results of the confirmatory factor analysis are based on the full model including also the variables of the performance model but excluding, as is common practice, the control variables. For the regression analysis, the items were aggregated by averaging across the items.

Exploration. To measure the focus on exploration in procurement activities, I adopted a measure of exploration and exploitation developed by Lubatkin et al. (2006) for the firm level. For the measure of exploration orientation in procurement activities I modified the original items for the level of the procurement organization. Of initially four items that formed the exploration orientation measure, three items that focus on novel products and services were maintained. For each of the items, the detailed question, minimum value, maximum

value, means, standard deviations, and factor loading in the confirmatory factor analysis are reported in Table 8.

Table 8 Descriptive statistics of exploration measure

Measurement item	Min	Max	Mean	Std. Dev	Load.
looks for novel technological ideas for your firm's product and services by thinking "outside the box"	1	7	4.647	1.397	0.852
bases its success on the ability to explore new technologies for the products and services your firm provides	1	7	4.377	1.333	0.820
sources products or services that are novel to the firm	2	7	4.588	1.240	0.739

Table 9 summarizes scores related to the reliability and validity of the exploration measure.

Table 9 Reliability and validity scores of the exploration measure

	AVE	MSV	ASV	CR	Alpha
Exploration	0.648	0.350	0.195	0.908	0.860

Exploitation. Also the measure of the focus on exploitation in procurement activities draws upon the measure of exploration and exploitation developed by Lubatkin et al. (2006). Three items that focus on satisfying existing stakeholders needs through refinement were adapted to form the exploitation orientation construct. For each of the items, the detailed question, minimum value, maximum value, means, standard deviations, and factor loading are reported in Table 10.

Table 10 Descriptive statistics of exploitation measure

Measurement item	Min	Max	Mean	Std. Dev	Load.
constantly surveys stakeholders' satisfaction	1	7	4.521	1.617	0.739
fine-tunes activities to keep its current stakeholders satisfied	1	7	5.017	1.246	0.856
penetrates more deeply into its existing stakeholder base	2	7	5.035	1.152	0.665

Table 11 summarizes scores related to the reliability and validity of the exploration measure.

Table 11 Reliability and validity scores of the exploitation measure

	AVE	MSV	ASV	CR	Alpha
Exploitation	0.592	0.391	0.143	0.882	0.781

Balance of exploration and exploitation. To measure the balance between exploration and exploitation, the exploration and exploitation measures were aggregated by averaging the value of the items forming the scale and the measure of balance was created from these aggregate measures. Following prior literature (He and Wong, 2004, Jansen, Tempelaar, van den Bosch and Volberda, 2009, Lubatkin, Simsek, Ling and Veiga, 2006) I created three variants

of measures for the balance between exploration and exploitation using the difference, sum and the product of the aggregated exploration and exploitation measures and compared the F-values and R^2 values of models with these different measure variants. In the final analyses only the multiplicative variant of the measure was retained since it exhibited the best fit.

Centralization. One of the central questions in research on the structure of procurement is whether to centralize or decentralize procurement (Corey, 1978, Germain and Droge, 1997, Johnson and Leenders, 2006, Johnson, Shafiq, Awaysheh and Leenders, 2014). While early research on centralization simply distinguishes between centralized and decentralized organizations, the emergence of more complex organizational forms such as matrix organizations (Narasimhan and Carter, 1990) or functional international procurement groups (Giunipero and Monczka, 1990) suggests that centralization and decentralization are the ends of a continuum on which many gradations are possible. I followed this later stream of research and adapted a measure from Quintens et al. (2006) who focus on the centralization of buying process. Four items were used relating to the extent that the procurement organization centralizes the several aspects of procurement process. Table 12 summarizes the detailed question, minimum value, maximum value, means, standard deviations, and factor loading for each of the items.

Table 12 Descriptive statistics of centralization of procurement activities measure

Measurement item	Min	Max	Mean	Std. Dev	Load.
centralization of supply market analysis and potential supplier investigation	1	7	4.847	1.772	0.589
supplier selection by centralized procurement	1	7	4.907	1.773	0.864
negotiation and contracting by centralized procurement	1	7	5.195	1.581	0.936
supplier relationship management by centralized procurement	1	7	5.025	1.598	0.851

Table 13 summarizes scores related to the reliability and validity of the centralization of procurement activities measure.

Table 13 Reliability and validity scores of the centralization of procurement activities measure

	AVE	MSV	ASV	CR	Alpha
Centralization	0.673	0.165	0.097	0.933	0.882

Strategic integration. To measure strategic integration I used five statements that are derived from the study of Gonzalez-Benito (2007) that investigated procurement's contribution to business performance and develops a measure of strategic integration that draws upon prior literature (Carr and Pearson, 1999, Narasimhan and Das, 2001). Strategic integration reflects the extent that the procurement organization is embedded in the organization on a strategic level.

Of the five statements originally developed, four items were retained after the confirmatory factor analysis which relate to the participation in the strategy process, training and knowledge about strategic objectives of the business, and incentives based on business strategy. Table 14 summarizes the detailed question, minimum value, maximum value, means, standard deviations, and factor loading for each of the items.

Table 14 Descriptive statistics of strategic integration of procurement activities measure

Measurement item	Min	Max	Mean	Std. Dev	Load.
Regularly attend strategy meetings and participate in the strategic planning process of the business	1	7	4.669	1.542	0.837
Have a good knowledge of the business strategic objectives	2	7	5.347	1.284	0.782
Are measured in terms of their contribution to the strategic objectives of the business	1	7	4.457	1.606	0.761
Are being trained to meet the needs derived from strategic plans of the business	1	7	4.348	1.499	0.786

Table 15 summarizes scores related to the reliability and validity of the strategic integration measure.

Table 15 Reliability and validity scores of the strategic integration of procurement activities measure

	AVE	MSV	ASV	CR	Alpha
Strategic integration	0.627	0.450	0.221	0.923	0.871

Contextual ambidexterity. To measure contextual ambidexterity, I draw upon the work of Gibson and Birkinshaw (2004). Gibson and Birkinshaw (2004) view contextual ambidexterity as a multidimensional construct that consists of several dimensions each measured with its own sub-scale but jointly describe an organizational context that should support exploration and exploitation.

Specifically, drawing upon their measurement approach, I measured three subscales that capture performance management, support, and trust. Performance measurement refers to an organizational context based on clear performance and behavioral standards, and their application in performance measurement and feedback and stretch goals. The measure adopted here contains five items. Support refers to a range of mechanisms that enable members of the procurement organization to achieve these goals. Trust reflects an organizational climate in which organizational members are enabled to cooperate to achieve goals and experience fair and equal treatment. The scales for trust and support consist of two items each.

In the regression models, I used the three sub-scales separately and in robustness tests a composite measure was used that was created by multiplying the average across the items of the subscales (Gibson and Birkinshaw, 2004) with similar results. Table 16, Table 18, and Table 20 summarize the detailed question, minimum value, maximum value, means, standard deviations, and factor loading for each of the items of the three sub-scales.

Table 16 Descriptive statistics of performance management sub-scale

Measurement item	Min	Max	Mean	Std. Dev	Load.
set demanding goals	1	7	5.578	1.224	0.674
make a point of stretching the skills of people	2	7	5.036	1.190	0.658
hold people accountable for their performance	1	7	5.207	1.361	0.709
use their appraisal feedback to improve their performance	1	7	5.177	1.441	0.794
devote considerable effort to developing their subordinates	1	7	4.766	1.307	0.789

Table 17 summarizes scores related to the reliability and validity of the performance management subscale of the contextual ambidexterity measure.

Table 17 Reliability and validity scores of the performance management sub-scale

	AVE	MSV	ASV	CR	Alpha
Performance management	0.529	0.542	0.209	0.905	0.853

While the average variance extracted (AVE) for the performance management subscale is below the maximum shared square variance (MSV), thereby not fulfilling one criterion for discriminant validity, the shared variance that exceeds the average variance extracted is with another sub-scale of the contextual ambidexterity measure and therefore does not give reason for concern.

Table 18 Descriptive statistics of trust sub-scale

Measurement item	Min	Max	Mean	Std. Dev	Load.
treat failure (in a good effort) as a learning opportunity, not something to be ashamed of	1	7	5.138	1.444	0.737
be willing and able to take prudent risks	1	7	5.421	1.551	0.778

Table 19 summarizes scores related to the reliability and validity of the trust subscale of the contextual ambidexterity measure.

Table 19 Reliability and validity scores of trust sub-scale

	AVE	MSV	ASV	CR	Alpha
Trust	0.574	0.594	0.285	0.826	0.710

Also for the trust subscale, the average variance extracted (AVE) is below the maximum shared square variance (MSV), violating one of the recommended criteria for discriminant validity. However, also for this sub-scale, the shared variance that exceeds he average variance extracted is with another sub-scale of the contextual ambidexterity measure and therefore does not give cause for concern.

Table 20 Descriptive statistics of support sub-scale

Measurement item	Min	Max	Mean	Std. Dev	Load.
give ready access to information that others need	2	7	5.368	1.146	0.689
base decisions on facts and analysis, not politics	2	7	4.939	1.259	0.794

Table 21 summarizes scores related to the reliability and validity of the support subscale of the contextual ambidexterity measure.

Table 21 Reliability and validity scores of the support sub-scale

	AVE	MSV	ASV	CR	Alpha
Support	0.552	0.594	0.265	0.810	0.754

Also for the support subscale the average variance extracted (AVE) is below the maximum shared square variance (MSV) as with the other two sub-scales of the contextual ambidexterity measure. As with these two sub-scales, the shared variance that exceeds the average variance extracted is with another sub-scale of the contextual ambidexterity measure and therefore does not provide reason for concern.

Control variables. Focus on exploration or exploitation can be expected to depend on the *goals of the procurement organization*. To control for the attention these goals receive in the procurement organization (Bouquet et al., 2009, Krause, Pagell and Curkovic, 2001), I measure the importance of ten commonly used key performance indicators for the procurement activities of the organization. Respondents were asked to rate the importance of KPIs related to savings, profit and loss impact, reduction of suppliers, reduction of invoices, payment terms, innovation, time-to-market, quality, delivery reliability of key suppliers and internal stakeholder satisfaction.

One of the key mechanisms discussed in the literature to balance exploration and exploitation, is their structural separation (Cao, Gedajlovic and Zhang, 2009, He and Wong, 2004, Jansen, Tempelaar, van den Bosch and Volberda, 2009, Tushman and O'Reilly, 1996). While based on the literature review I expect that this mechanism is not central when aiming to balance these activities within a function like procurement, I devised a control question to capture if exploration activities were separated within procurement. To measure the separation of exploration, the variable *structural separation* is based on a single item that asks respondents if innovation activities in the procurement organization are separated.

Since I collected data in two countries that differ along a number of dimensions, it is important to control if systematic differences may exist in the procurement of Swiss and Finnish firms. To capture this effect c*ountry* was measured with the help of a dummy variable which took the value 0 for Finnish firms and 1 for Swiss firms.

Firm size was measured using the number of employees. To further ensure confidentiality I used an ordinal scale with four size categories: 0-250 employees, 250-1000 employees, 1000-5000 employees and over 5000 employees.

Prior research suggests that in in service firms procurement in service firms may differ systematically compared to procurement in manufacturing firms. To control for this potential effect, I created a dummy variable, *product/service*

focus, that took the value of zero for firms that derive their revenue predominantly from products and one for firms that derive their revenue predominantly from services.

Finally, I control for industry effects by including a dummy variable for each industry. The base category is the arboriculture forestry and fishing industry. The descriptive statistics of these control variables are discussed in the descriptive analysis section.

7.7 Variables Performance Model

The constructs operationalized for the behavioral model (hypothesis 4) include

Dependent Variable

- Procurement performance

Independent variables

- Exploration
- Exploitation
- Balance of exploration and exploitation

Control variables

- Focus on procurement goals
- Country
- Firm size
- Product/service company
- Industry

Procurement performance. To measure the performance of procurement, I measure the procurement organization's performance relative to 8 key performance indicators (KPI) that relate to four broad areas of performance: Savings and profitability, reduction of suppliers and invoices, reliability and innovation. I measure each of these four areas of performance by two KPIs.

Respondents were asked to evaluate the extent to which the firm's procurement organization performs relative to targets (1 = not at all , 7 = very high extent). After confirmatory factor analysis, the reduction of suppliers and invoices was dropped because of poor fit. The final measure therefore retains three subscales with two KPI each. And separate regression models were constructed for each of these three sub-scales since exploration, exploitation, and their balance may differ in their relationship with each of these sub-dimensions.

Table 22 summarizes the detailed question, minimum value, maximum value, means, standard deviations, and factor loading for each of the items of the profitability sub-scale that focuses on savings and impact to profit and loss.

Table 22 Descriptive statistics of savings and profitability sub-scale

Measurement item	Min	Max	Mean	Std. Dev	Load.
Savings	3	7	5.043	1.127	0.714
Impact on profit and loss	2	7	4.673	1.153	0.895

Table 23 summarizes scores related to the reliability and validity of aggregate profitability subscale. The values for reliability and validity are within the ranges for valid measures. For the regression analysis an aggregate measure was formed.

Table 23 Reliability and validity scores of savings and profitability sub-scale

	AVE	MSV	ASV	CR	Alpha
Savings and profitability	0.655	0.150	0.081	0.869	0.786

Table 24 summarizes the detailed question, minimum value, maximum value, means, standard deviations, and factor loadings for each of the items of the reliability sub-scale. The measurement items focus on quality of supply and the delivery reliability of key suppliers.

Table 24 Descriptive statistics of reliability sub-scale

Measurement item	Min	Max	Mean	Std. Dev	Load.
Quality	2	7	4.598	1.069	0.831
Delivery reliability of key suppliers	1	7	4.452	1.149	0.816

Table 25 summarizes scores related to the reliability and validity of the reliability subscale. The values for reliability and validity are within the ranges for valid measures. For the regression analysis an aggregate measure was formed.

Table 25 Reliability and validity scores of reliability sub-scale

	AVE	MSV	ASV	CR	Alpha
Reliability	0.678	0.324	0.116	0.885	0.791

Table 26 summarizes the detailed question, minimum value, maximum value, means, standard deviations, and factor loading for each of the items of the innovation sub-scale. The items focus on innovation measure through new products and services sourced from suppliers and time to market.

Table 26 Descriptive statistics of innovation sub-scale

Measurement item	Min	Max	Mean	Std. Dev	Load.
Innovation (new products and services sourced from suppliers)	2	6	3.990	0.942	0.775
Time to market	1	6	4.021	1.005	0.736

Table 27 summarizes scores related to the reliability and validity of the innovation subscale. The values for reliability and validity are within the ranges for valid measures. For the regression analysis an aggregate measure was formed.

Table 27 Reliability and validity scores of innovation sub-scale

	AVE	MSV	ASV	CR	Alpha
Innovation	0.571	0.324	0.106	0.824	0.720

Independent and control variables were measured as described in the section on the behavioral model described above. The descriptive statistics of these control variables are discussed in the descriptive analysis section.

8. Descriptive Analysis

To gain a deeper understanding of the firms in the sample and to prepare the ground for the regression analysis that will be presented in the next chapter, this chapter presents the descriptive analysis. The chapter starts out with a descriptive analysis of the control variables as well as of several additional variables that are not part of the regression analysis. I use these additional variables to further describe procurement activities in the firms I studied. This is followed by the descriptive analysis of the independent and dependent variables that are part of the regression analysis.

8.1 Descriptive analysis of control variables

Firm size. The results regarding the size of the firm measured through the number of employees are summarized in Table 28. Of the 118 organizations that responded to the questionnaire, only three fall into the size category of below 250 employees. 13 organizations, that is 11%, fall in the category between 250 and 1000 employees. 42 organizations or 35.6% of the responding organizations had between 1000 5000 employees and 59 organizations that is 50% of the organizations fall into the size category over 5000 employees.

Table 28 Size of firms

Size category	Number of firms	Percent
0-250	3	2.5
250-1000	13	11.0
1000-5000	42	35.6
Over 5000	59	50.0

This result is not surprising given that substantial procurement organizations tend to be found mostly in large organizations and in the smaller organizations that were also contacted, respondents may be occupied mostly with operational procurement tasks and may have found the questionnaire less relevant. At the same time, these results also suggest that the researcher and by extension the reader need to be careful when interpreting the results as these results may hold most clearly for large organizations and are likely to be less applicable to small and medium sized firms. However, the same can probably be

said of the large majority of research on procurement organizations as elaborate organizations simply are absent in small to medium sized firms.

Main source of revenue. Respondents were also asked about the main source of revenue for the organization. Table 29 summarizes the results for this question.

Table 29 Main source of revenue

Focus	Number of firms	Percent
Product focused	84	71.8
Service focused	33	28.2

Of the responding organizations, 84 organizations, that is 71.8%, classified themselves as product focused why 33 organizations, that is 28.2%, classified themselves as service focused. Product focused organizations often tend to emphasize direct procurement given that it often constitutes the largest share of spend and is also directly linked to the performance of the organization. In contrast, service focused organizations tend to emphasize indirect procurement that is the sourcing and procurement of non-production items (e.g., Cox, Chicksand, Ireland and Davies, 2005).

When one compares the results from Table 29 with the breakdown of firms across industries summarized in Table 6, it is interesting to note that the fraction of firms that describe themselves as service focused is larger than one would expect given the industry breakdown of the firms in the sample where about 15% of the firms come from typically service focused industries. This suggests that also in traditionally product focused industries service has become increasingly important and some product firms have transformed themselves into service businesses.

Corporate Strategy. To understand the overall focus of the firms in the sample and given that the focus of the present study is related to short-term goals (in exploitation orientation) and long-term goals (in exploration orientation), it is important to understand the strategy of the firms in the sample. To this effect, questions where included that asked respondents to rate to which extent several strategic goals are important for their corporation's strategy (Baier, Hartmann and Moser, 2008). Table 30 summarizes the results from these questions.

While strategy literature has emphasized the trade-offs between cost and differentiation goals (Porter, 1980), I chose a broader range of more tangible goals and allowed respondents to classify their organization as focusing on multiple, potentially conflicting, goals. Goals included cost leadership, quality leadership, technology leadership, service leadership, brand leadership, standardization, and customization. Given that a firm may score high on more than one goal, correlation analysis seems warranted to examine to which extent different goals co-occur in the firms in the sample.

Table 30 Corporate strategy type pursued by the firms in the sample

	N	Mean	Median	Std. Dev.	Min	Max
Cost leadership	118	5.62	6.00	1.377	1	7
Quality leadership	117	6.15	6.00	1.039	1	7
Technology leadership	118	5.56	6.00	1.500	1	7
Service leadership	116	5.72	6.00	1.394	0	7
Brand leadership	116	5.49	6.00	1.607	1	7
Standardization	116	4.71	5.00	1.427	1	7
Customization	116	5.15	5.00	1.391	2	7

Table 31 presents the correlation analysis among the different dimensions of corporate strategy. Cost leadership and standardization which can be understood as two dimensions of a cost-based strategy (Baier, Hartmann and Moser, 2008, Porter, 1980) are significantly correlated. Similarly, technology leadership, quality leadership, service leadership, customization, and brand leadership are all significantly correlated among each other. These five strategic goals can be understood as different reflections of a differentiation strategy and have been used in prior studies as indicators to measure a differentiation strategy (Baier, Hartmann and Moser, 2008, Porter, 1980). In other words, while I chose a broader range of tangible strategic goals to facilitate responses by respondents that were not necessarily part of the firm strategy process, responses suggest that firms seem to more likely pursue either a cost based strategy or a differentiation based strategy and combine one or several strategic goals that fit with this strategy.

One implication emerging from the correlation of strategic goals is that firms would seem to reduce the potential conflicts that may arise from pursuing strategic goals that are diametrically opposed by focusing on groups of goals that have relatively similar implications for strategy implementation. However also for these goals trade-offs between short-term exploitation and long-term exploration continue to exist but less so than between cost leadership strategies and differentiation strategies (Porter, 1980).

Table 31 Correlation among dimension of corporate strategy

	1	2	3	4	5	6	7
(1) Cost leadership	1.000						
(2) Standardization	0.357	1.000					
	0.000						
(3) Technology leadership	0.042	0.063	1.000				
	0.651	0.502					
(4) Quality leadership	-0.027	-0.079	0.253	1.000			
	0.777	0.402	0.006				
(5) Service leadership	-0.098	0.103	0.294	0.217	1.000		
	0.293	0.276	0.001	0.020			
(6) Customization	-0.034	0.018	0.364	0.239	0.224	1.000	
	0.721	0.853	0.000	0.010	0.016		
(7) Brand leadership	-0.145	-0.032	0.220	0.272	0.199	0.227	1.000
	0.122	0.734	0.018	0.003	0.034	0.015	

p-values below the coefficient

Focus on procurement goals. While most organizations traditionally have been focused on savings as the prime or only goal of procurement, procurement goals have gradually broadened and may include a variety of goals that may be derived from the firm's strategy. By measuring the firm's emphasis among different goals one can deduct the functional strategy (Krause, Pagell and Curkovic, 2001). Procurement organizations that focus mostly on cost and savings may disregard other important competitive dimensions such as quality or innovation thus potentially jeopardizing the effectiveness of procurement (Baier, Hartmann and Moser, 2008).

To understand the importance of different procurement goals for the organization, respondents were asked to rate to which extent their procurement organization assigns importance, measures and follows a set of 10 typical key performance indicators (KPIs) used in procurement. Table 32 summarizes the descriptive statistics regarding these KPIs.

It is noteworthy, that savings continue to be pursued by the great majority of organizations as suggested by a very high mean and median value and a small standard deviation. In the procurement organizations I investigate, also quality and delivery reliability and to a smaller extent impact on profit and loss, payment terms and internal stakeholder satisfaction received substantial attention. In contrast invoice reduction and time to market receive significantly less attention while supplier reduction and innovation receive moderate attention. This suggests that traditional procurement goals continue to play a major role in the everyday life of procurement organizations I studied.

Table 32 Focus on procurement goals

	N	Mean	Median	Std. Dev.	Min	Max
Savings	118	6.30	7.00	.870	3	7
Impact on profit and loss	113	5.67	6.00	1.392	1	7
Supplier reduction	118	4.73	5.00	1.494	1	7
Invoice reduction	118	3.99	4.00	1.662	1	7
Payment terms	118	5.32	6.00	1.364	1	7
Innovation (new products and services sourced from suppliers)	118	4.52	5.00	1.621	1	7
Time to market	110	4.37	4.00	1.807	1	7
Quality	118	6.04	6.00	1.128	1	7
Delivery reliability	117	6.03	6.00	1.050	2	7
Internal Stakeholder satisfaction	118	5.43	6.00	1.465	1	7

Also for this set of measures I conducted correlation analysis to examine the co-occurrence of different goals. Table 33 summarizes the results of this analysis. A broad pattern of significant correlations in this table provides evidence that organizations tend to focus simultaneously on multiple goals. However, several patterns are again noteworthy. First, also for procurement goals, the results suggest two clusters of related factors that revolve around the savings KPI and the innovation KPI. While savings KPI tends to be important in almost all organizations, they seem to be most commonly accompanied by KPIs related to profit and loss impact, supplier reduction, invoice reduction, and payment

terms KPIs. Such a pattern would seem to reflect a strong emphasis on cost and efficiency.

Second, the innovation KPI co-occurs with other KPIs such as time to market, quality, delivery read reliability, and internal stakeholder satisfaction that are less related to the finance function but rather with operations and innovation. Taken together we may interpret these results such that some organizations emphasize financial KPIs while others emphasize operations related KPIs.

Finally, the only KPI that seems to co-occur with almost all other KPIs (with the exception of payment terms) is the profit and loss impact KPI. Little surprising profit and loss impact can be important in financially oriented and operations oriented procurement organizations and could be considered as the final goal of all procurement organizations.

Table 33 Correlation among procurement goals

	1	2	3	4	5	6	7	8
(1) KPI__Imp_Savings	1.000							
(2) KPI_Imp_PampL_Impact	0.258	1.000						
	0.006							
(3) KPI_Imp_Suppl_Reduction	0.365	0.219	1.000					
	0.000	0.020						
(4) KPI_Imp_Invoice_reduction	0.232	0.300	0.584	1.000				
	0.011	0.001	0.000					
(5) KPI_Imp_Pay_terms	0.257	0.119	0.441	0.280	1.000			
	0.005	0.210	0.000	0.002				
(6) KPI_Imp_Innovation	0.090	0.348	0.157	0.217	0.148	1.000		
	0.331	0.000	0.089	0.018	0.109			
(7) KPI_Imp_Time_to_market	0.113	0.427	0.185	0.355	0.156	0.700	1.000	
	0.238	0.000	0.053	0.000	0.104	0.000		
(8) KPI_Imp_Quality	0.057	0.227	0.032	0.009	0.074	0.226	0.412	1.000
	0.542	0.015	0.729	0.920	0.423	0.014	0.000	
(9) KPI_Imp_Del_rel	0.055	0.227	0.100	0.153	0.052	0.242	0.416	0.492
	0.559	0.016	0.286	0.100	0.577	0.009	0.000	0.000
(10) KPI_Imp_Stakeholder_satisfaction	0.100	0.322	0.284	0.384	0.062	0.431	0.384	-0.032
	0.283	0.001	0.002	0.000	0.502	0.000	0.000	0.732

	9	10
KPI_Imp_Del_rel	1.000	
KPI_Imp_Stakeholder_satisf	0.142	1.000
	0.127	

p-values below the coefficient

Structural separation. To examine if the organization separates exploration related activities in procurement from exploitation related activities in procurement as literature on structural separation suggests, respondents were asked to answer to a single item question that reflected the extent to which the organization has dedicated people focusing on innovation and flexibility in the procurement organization. The results regarding the structural separastion are summarized in Table 34. The relatively low mean value of 3.28 and the median of three suggest that this set up is relatively scarce in the organizations in the sample. This is surprising given the relatively large size of the organizations and the call for dedicated personnel focusing on innovation (Schiele, 2010).

Table 34 Structural separation

	N	Mean	Median	Std. Dev.	Min	Max
Our organization has separate people focusing on procurement innovation and flexibility.	115	3.28	3.00	1.940	1	7

Hierarchical and functional embeddedness. To examine how procurement is embedded in the overall organization, respondents were asked about the level in the organization the most senior procurement leader is reporting to and the function procurement is embedded in. In line with the maturing of procurement as an organizational function and its increased strategic importance also the seniority of procurement has changed substantially with an increasing seniority of the most senior procurement leader and an increased business scope of the roles of procurement leaders (Johnson, Leenders and Fearon, 2006, Pooley and Dunn, 1994). Increasingly chief procurement officers are either part of the top management team or reporting to one of the executives reflecting the increased status and importance procurement has gained in the organization (Johnson, Leenders and Fearon, 2006). Prior research suggests that the higher the organizational level the most senior procurement executive is reporting to the more likely procurement is viewed as a strategic function in the more likely it is involved in strategic decisions (Johnson, Leenders and Fearon, 2006).

In my survey, respondents were asked if the procurement head was an executive reporting directly to the CEO (level 1 of management), a senior leader reporting to an executive (level 2 of management) or on a lower level in the corporate hierarchy (level 3 or lower). The results regarding the hierarchical embedding are summarized in Table 35. 27, that is 22.9%, of the organizations were led by a level I leader, 79, that is 66.9%, organizations were led by a level II leader, and 12, that is 10.2%, of the organizations were led by a leader lower in the corporate's hierarchy. Combined with the overall large size of the firms responding these figures highlight the growing importance of procurement in large corporations. In the firms I studied, the voice of procurement clearly has the ear of the executives if not the CEO given the reporting relationships.

Table 35 Hierarchical embedding of the procurement organization

	Number of respondents	Percent
An executive reporting to the CEO (Level 1 of management)	27	22.9
A senior individual reporting to an executive (Level 2 of management)	79	66.9
Lower in the corporate's hierarchy (Level 3 or below of management)	12	10.2

Respondents were further asked about the location of the majority of procurement activities in the overall organization. Also the horizontal placement in the organizational structure may be important since different functions are likely to vary in their emphasis on different goals, may be driven by different time horizons, and may face constraints in terms of the organizational design. For instance, a procurement organization that is part of a finance organization

can be expected to focus more strongly on financial KPIs and may be more short term oriented given the requirements of financial reporting. In contrast a procurement organization that is part of operations may follow a broader set of goals and measures and may find it easier to pursue a long term orientation. Finally, a procurement organization that is a separate function may exhibit most flexibility in terms of goals pursued and in terms of organizational design.

The results regarding the horizontal embedding are summarized in Table 36. Respondents could choose among several categories including a separate function under the CEO, a part of corporate finance, a part of operations, a part of supply chain management, a decentralized activity, outsourced activity, and an "other" category.

Table 36 Functional embedding of the procurement organization

Function	Number of respondents	Percent
Separate function under the CEO	21	17.8
Part of corporate finance	18	15.3
Part of operations	35	29.7
Part of supply chain management	20	16.9
Decentralized across several functions or businesses	15	12.7
Outsourced to external provider	0	0.0
Other	9	7.6

The responses suggest a wide variety of organizational models that may reflect the broad range of industries studied but may also be evidence for the differences in maturity of procurement organizations. 55 organizations that is 46.6% continue to be part of operations (35 organizations) or supply chain management (20 organizations). However, also 55 organizations, that is 46.6% organized procurement either as a separate function under the CEO (21 organizations), as part of corporate finance (18 organizations) or decentralized across several functions or businesses (16 organizations).

Notable is that despite the recent trend to outsourcing and the emergence of a substantial number of specialized procurement outsourcing providers, none of the firms in the sample had outsourced the majority of activities to an external provider. This result however needs to be looked upon with a grain of salt for several reasons. First, given that firms in which such outsourcing may have taken place may be less likely to respond to a procurement related questionnaire. Second, outsourcing may be limited only to operational procurement and therefore respondents may not have perceived that the majority of procurement was outsourced. Finally, outsourcing procurement requires a very high level of procurement maturity and such procurement maturity may continue to be very rare.

Focus of personal time and attention. To get some insight on how different procurement goals affect the focus of attention in daily procurement activities, respondents were asked to allocate 100 points based on the relative

amount of time spent on several activities during a typical work week. Results are summarized in Table 37.

Respondents suggested that about a third of their time is spent on achieving cost savings. Other goals including improving quality, and improving delivery reliability, searching for new ways to improve long term flexibility, exploring new technologies products and services, and experimenting with new procurement ideas, practices, and processes received a roughly similar amount of attention ranging between 10 and 15 percent of the respondents' time. These results suggest that even for the senior procurement leaders that where the majority of respondents of this questionnaire work on cost savings is a substantial part of their weekly routine work.

Table 37 Focus of time and attention among procurement personnel

	Mean	Median	Std. Dev.	Min	Max
Achieving cost savings	33.83	30.00	17.910	0	100
Improving quality	13.96	10.00	8.008	0	40
Improving delivery reliability (e.g. time, amounts, etc.)	13.70	10.00	10.970	0	60
Search for ways to improve long term flexibility	11.93	10.00	7.770	0	40
Exploring novel technologies, products and services from suppliers	11.44	10.00	8.906	0	50
Experiment with new procurement ideas, practices, and processes	16.50	15.00	12.277	0	60

One may expect that the time spent on different goals differs based upon the role and seniority of the respondent in the organization. In particular, one would expect that with increasing seniority long term goals such as experimentation with new technologies, new suppliers and in particular new procurement ideas become more important. To test this idea, I conducted a correlation analysis between the time spent on the activities above and the role of the respondent in the organization. To my surprise, the results of this analysis did not show any significant correlation between time spent on different goals and respondent seniority. In other words, the focus on attention seems to be driven by the goals of the procurement organization and not the level in the hierarchy.

8.2 Descriptive analysis of the independent and dependent variables used in the regression analysis

In this section, I present a brief a descriptive analysis of the variables used in the regression models. Whereas the analysis of the variable presented in the previous section has been to provide complementary insights to the regression analysis that follows in the next section, the purpose of this section is strictly in providing a basic understanding of the raw data and thereby preparing the ground for the regression analysis. As a result, interpretation will mainly take place in the next chapter that presents the regression analysis.

Financial Procurement performance. Table 38 summarizes the descriptive statistics for the financial procurement performance measure. Respondents were self-evaluating the performance of the procurement organization on two financial performance KPIs. It is noteworthy that for this measure the mean (4.879) and median (5.00) are relatively high and the responses range from a minimum of three to the maximum of seven suggesting that the respondents self-evaluate the procurement performance on financial metrics is relatively high.

Table 38 Descriptive statistics of financial procurement performance measure

	N	Mean	Median	Std. Dev.	Min	Max
KPI_Performance_Fin	103	4.879	5.00	1.081	3	7

Procurement innovation performance. Table 39 presents the descriptive statistics of procurement innovation performance. In comparison to the financial procurement performance measure, the responses for the measure of procurement innovation performance exhibit a broader range from 1.5 to 6 and cluster around the median of 4 though the mean (3.038) is somewhat smaller. The values suggest that procurement innovation performance is substantially lower than financial procurement performance. A t-test supports that this difference is statistically significant ($p = 0.0000$, one-tailed test).

Table 39 Descriptive statistics of procurement innovation performance measure

	N	Mean	Median	Std. Dev.	Min	Max
KPI_Performance_Inno	91	3.038	4.00	0.864	1.5	6

Procurement operational performance. Table 40 presents the descriptive statistics for the procurement operational performance measure. Values range from 227 with a mean of 4.527 and a median of 4.00. Also procurement operational performance is statistically significantly lower than financial procurement performance ($p= 0.0047$, one-tailed test) and statistically significantly higher than procurement innovation performance ($p= 0.0000$, one-tailed test).

Table 40 Descriptive statistics of procurement operational performance measure

	N	Mean	Median	Std. Dev.	Min	Max
KPI_Performance_Ops	112	4.527	4.00	1.013	2	7

Exploration orientation. Table 41 presents the descriptive statistics of the exploration orientation measure. Values range from 1.33 to 7 with a mean of 4.539 and a median of 4.667.

Table 41 Descriptive statistics of exploration orientation measure

	N	Mean	Median	Std. Dev.	Min	Max
exploration_new	116	4.539	4.667	1.165	1.33	7

Exploitation. Table 42 presents the descriptive statistics for the exploitation orientation measure. Values range from 1.6727 with a mean of 4.855 and a median of 5.00. These values suggest that firms in the sample exhibit a higher mean exploitation orientation than a mean exploration orientation. A t-test confirms that this difference is statistically significant (p = 0.0069, one-tailed test). This results suggests that exploitation continues to dominante procurement activities in the firms I studied.

Table 42 Descriptive statistics of exploitation orientation measure

	N	Mean	Median	Std. Dev.	Min	Max
exploitation_new	117	4.855	5.00	1.124	1.67	7

Balance of exploration and exploitation. Table 43 summarizes the descriptive statistics for the balance of exploration and exploitation measure. Since this measure was created by multiplying the exploration and exploitation measure it ranges from a minimum of 1.78 to a maximum of 49 with the mean of 22.68 and a median of 22.56.

Table 43 Descriptive statistics of the balance of exploration and exploitation measure

	N	Mean	Median	Std. Dev.	Min	Max
Balance_content_multiplicative	117	22.681	22.563	9.936	1.78	49

Centralization of procurement activities. Table 44 summarizes the descriptive statistics for the centralization of procurement measure. Values range from 1 to 7 with amino 4.99 and a median of 5.25.

Table 44 Descriptive statistics of centralization of procurement measure

	N	Mean	Median	Std. Dev.	Min	Max
Centralization	118	4.994	5.25	1.447	1	7

Strategic integration of procurement activities. Table 45 summarizes the descriptive statistics for the strategic integration of procurement measure. Values range from 1.25 to 7 with a mean of 4.71 and a median of 4.75.

Table 45 Descriptive statistics of strategic integration of procurement measure

	N	Mean	Median	Std. Dev.	Min	Max
Strategic_integration	115	4.709	4.75	1.168	1.25	7

Performance management. Table 46 summarizes the descriptive statistics of the measure for the performance management dimension of contextual

ambidexterity. Values range from 1.8 to 7 with a mean of 5.15 and a median of 5.4.

Table 46 Descriptive statistics of the measure for the performance management dimension of contextual ambidexterity

	N	Mean	Median	Std. Dev.	Min	Max
Performance_management	107	5.153	5.40	1.055	1.8	7

Support. Table 47 summarizes the descriptive statistics of the measure for the support dimension of contextual ambidexterity. Values range from 1.5 to 7 with amino 5.268 and a median of 5.5.

Table 47 Descriptive statistics of the measure for the support dimension of contextual ambidexterity

	N	Mean	Median	Std. Dev.	Min	Max
Support	114	5.268	5.50	1.319	1.5	7

Trust. Table 48 presents the descriptive statistics of the measure for the trust dimension of contextual ambidexterity. Values range from 2 to 7 with amino 5.155 and a median of five.

Table 48 Descriptive statistics of the measure for the trust dimension of contextual ambidexterity

	N	Mean	Median	Std. Dev.	Min	Max
Trust	113	5.155	5.00	1.078	2	7

8.3 Correlations of the variables in the regression models

Table 49 presents the correlation among the variables used in the regression models. Several observations emerge. Correlations are in the direction to be expected based on prior research and the hypotheses. Only the correlation between exploration and the balance between exploration and exploitation is of such magnitude (0.937) that it suggests the likelihood of multicollinearity problems in the regression analysis. To further explore potential multicollinearity, I therefore inspected the variance inflation factors (VIF) alongside the regression models I conducted. The VIF for the balance between exploration and exploitation exceeds 10 which further underlines that multicollinearity is an issue for this variable and the exploration variable. This suggests that in particular in the performance models, models with both variables will need to be interpreted with care. In the presence of multicollinearity, parameter estimates may be unreliable and coefficients estimates may change with small model changes. Some research suggests to address multicollinearity by mean centering variables in the model. However, research in marketing (Echambadi and Hess, 2007) strongly suggests that this approach does not substantially address multicollin-

earity and I therefore chose to use the uncentered variables. Rather, interpretation should focus on partial models rather than on full models that would include the collinear terms.

Other correlations are mostly below 0.5 suggesting weak or moderate correlation. Strong correlation is found between the three dimensions of contextual ambidexterity that is between performance management, support, and trust providing evidence that these dimensions are substantially related to one another as prior research on contextual ambidexterity suggests (Gibson and Birkinshaw, 2004). The three dimensions of contextual ambidexterity — performance management (0.586), support (0.546), and trust (0.509) — are also strongly related to strategic integration while correlations with centralization are weak to moderate. The VIF factors for these variables stayed below 2.5 and therefore well below the two commonly used cut-off points of 3 or 10 that prior research has suggested (Cohen et al., 2003, Kutner et al., 2004).

The correlation between the three measures of procurement performance are weak for the correlation between financial performance and innovation performance (0.261) and between financial performance and operational performance (0.267) and moderate between innovation performance and financial performance (0.407). This suggests that different drivers may be needed for each of these performance dimensions. Interestingly exploration and exploitation orientation are positively correlated (0.348) suggesting that there is no trade off among exploration exploitation orientation in the firms in the sample and supports the view that in some activities exploration and exploitation orientation may be close to orthogonal (Gupta, Smith and Shalley, 2006). Finally, it is noteworthy that structural separation exhibits no significant relationship with exploration or the balance between exploration and exploitation and a weak relationship with exploitation. This result suggests that structural separation of innovation activities place little role in affecting exploration, exploitation and their balance in the context of procurement activities. The VIF factors for these variables stayed below 2.5 and therefore well below the two commonly used cut-off points of 3 or 10 that prior research has suggested (Cohen, Cohen, West and Aiken, 2003, Kutner, Nachtsheim and Neter, 2004).

Table 49 Correlations among the variables used in the regression models

	VARIABLE	1	2	3	4	5	6	7	8
1	KPI_Performance_Fin	1.000							
2	KPI_Performance_Inno	0.261	1.000						
		0.016							
3	KPI_Performance_Ops	0.267	0.407	1.000					
		0.007	0.000						
4	exploration_new	0.219	0.335	0.209	1.000				
		0.028	0.001	0.028					
5	exploitation_new	0.064	0.102	0.190	0.348	1.000			
		0.524	0.335	0.046	0.000				
6	Balance_content_multiplica-tive	0.312	0.277	0.264	0.937	0.381	1.000		
		0.001	0.008	0.005	0.000	0.000			
7	Centralization	0.245	0.146	0.221	0.319	0.276	0.344	1.000	
		0.013	0.166	0.020	0.001	0.003	0.000		
8	Strategic_integration	0.227	0.127	0.222	0.422	0.517	0.436	0.342	1.000
		0.023	0.234	0.020	0.000	0.000	0.000	0.000	
9	Performance_management	0.144	0.169	0.229	0.553	0.508	0.513	0.273	0.586
		0.161	0.123	0.021	0.000	0.000	0.000	0.004	0.000
10	support	0.242	0.113	0.333	0.387	0.498	0.406	0.303	0.546
		0.016	0.294	0.000	0.000	0.000	0.000	0.001	0.000
11	trust	0.283	0.316	0.366	0.440	0.313	0.470	0.327	0.509
		0.005	0.003	0.000	0.000	0.001	0.000	0.000	0.000
12	Productservicebin	-0.190	-0.071	0.053	-0.090	0.161	-0.150	0.173	-0.006
		0.054	0.503	0.580	0.338	0.084	0.107	0.061	0.950
13	Country	0.064	0.134	0.160	0.040	-0.044	0.115	-0.069	-0.035
		0.520	0.206	0.092	0.668	0.639	0.218	0.456	0.715
14	Employees	-0.013	0.098	-0.033	0.180	0.256	0.101	0.027	0.163
		0.898	0.355	0.733	0.055	0.006	0.283	0.775	0.082
15	Structural separation	0.083	0.169	0.100	-0.002	0.174	0.030	-0.013	0.015
		0.412	0.115	0.302	0.983	0.064	0.753	0.892	0.873
16	KPI__Imp_Savings	0.136	0.046	0.127	0.078	0.241	0.059	0.102	0.291
		0.171	0.668	0.184	0.404	0.009	0.527	0.273	0.002
17	KPI_Imp_PampL_Impact	0.112	-0.005	0.036	0.325	0.310	0.316	0.023	0.329
		0.264	0.963	0.710	0.001	0.001	0.001	0.810	0.000
18	KPI_Imp_Pay_terms	0.338	0.015	0.100	0.097	0.224	0.138	0.165	0.303
		0.001	0.891	0.296	0.301	0.015	0.138	0.075	0.001
19	KPI_Imp_Quality	0.172	0.188	0.167	0.278	-0.137	0.245	0.091	0.096
		0.082	0.075	0.079	0.003	0.141	0.008	0.330	0.306
20	KPI_Imp_Stakeholder_satisf	-0.096	0.012	0.038	0.313	0.495	0.313	0.095	0.342
		0.333	0.909	0.695	0.001	0.000	0.001	0.306	0.000
21	KPI_Imp_Suppl_Reduction	-0.077	-0.063	0.144	0.274	0.367	0.257	0.200	0.344
		0.441	0.551	0.130	0.003	0.000	0.005	0.030	0.000
22	KPI_Imp_Time_to_market	0.046	0.282	0.090	0.430	0.094	0.384	0.142	0.408
		0.653	0.008	0.366	0.000	0.330	0.000	0.140	0.000
23	KPI_Imp_Del_rel	0.150	0.042	0.129	0.184	-0.044	0.168	0.041	0.269
		0.132	0.694	0.179	0.050	0.643	0.072	0.659	0.004
24	KPI_Imp_Innovation	-0.029	0.298	0.022	0.523	0.194	0.456	0.107	0.379
		0.775	0.004	0.818	0.000	0.036	0.000	0.248	0.000
25	KPI_Imp_Invoice_reduction	-0.053	-0.074	0.126	0.205	0.292	0.245	0.155	0.386
		0.597	0.484	0.186	0.027	0.001	0.008	0.094	0.000

	VARIABLE	9	10	11	12	13	14	15	16
9	Performance_management	1.000							
10	support	0.601	1.000						
		0.000							
11	trust	0.547	0.552	1.000					
		0.000	0.000						
12	Productservicebin	-0.027	-0.068	-0.043	1.000				
		0.786	0.474	0.655					
13	Country	-0.081	-0.141	-0.081	-0.139	1.000			
		0.407	0.135	0.391	0.132				
14	Employees	0.185	0.020	0.022	0.140	0.136	1.000		
		0.057	0.832	0.818	0.132	0.145			
15	Structural separation	-0.069	0.103	-0.081	-0.140	-0.056	0.107	1.000	
		0.485	0.279	0.400	0.137	0.556	0.260		
16	KPI__Imp_Savings	0.264	0.106	0.036	0.114	-0.007	0.411	0.041	1.000
		0.006	0.262	0.708	0.221	0.940	0.000	0.661	
17	KPI_Imp_PampL_Impact	0.282	0.184	0.135	0.068	0.041	0.104	0.155	0.258
		0.004	0.056	0.165	0.477	0.664	0.273	0.107	0.006
18	KPI_Imp_Pay_terms	0.253	0.219	0.239	-0.162	-0.186	-0.068	0.141	0.257
		0.009	0.019	0.011	0.080	0.044	0.469	0.133	0.005
19	KPI_Imp_Quality	0.293	0.162	0.251	-0.242	0.188	-0.004	-0.171	0.057
		0.002	0.085	0.007	0.008	0.042	0.969	0.067	0.542
20	KPI_Imp_Stakeholder_satisf	0.316	0.293	0.169	0.100	0.031	0.166	0.004	0.100
		0.001	0.002	0.073	0.280	0.743	0.073	0.965	0.283
21	KPI_Imp_Suppl_Reduction	0.377	0.188	0.182	0.164	-0.068	0.078	-0.015	0.365
		0.000	0.045	0.054	0.075	0.465	0.402	0.871	0.000
22	KPI_Imp_Time_to_market	0.370	0.291	0.353	-0.177	-0.017	0.002	0.032	0.113
		0.000	0.003	0.000	0.064	0.858	0.985	0.744	0.238
23	KPI_Imp_Del_rel	0.338	0.321	0.297	-0.204	-0.009	-0.117	-0.134	0.055
		0.000	0.001	0.002	0.028	0.923	0.211	0.154	0.559
24	KPI_Imp_Innovation	0.306	0.234	0.336	-0.083	-0.014	0.168	0.031	0.090
		0.001	0.012	0.000	0.374	0.883	0.071	0.746	0.331
25	KPI_Imp_Invoice_reduction	0.315	0.275	0.172	0.015	-0.049	0.090	0.143	0.232
		0.001	0.003	0.068	0.875	0.600	0.337	0.128	0.011

	VARIABLE	17	18	19	20	21	22	23	24	25
17	KPI_Imp_PampL_Impact	1.000								
18	KPI_Imp_Pay_terms	0.119	1.000							
		0.210								
19	KPI_Imp_Quality	0.227	0.074	1.000						
		0.015	0.423							
20	KPI_Imp_Stakeholder_satisf	0.322	0.062	-0.03	1.000					
		0.001	0.502	0.732						
21	KPI_Imp_Suppl_Reduction	0.219	0.441	0.032	0.284	1.000				
		0.020	0.000	0.729	0.002					
22	KPI_Imp_Time_to_market	0.427	0.156	0.412	0.384	0.185	1.000			
		0.000	0.104	0.000	0.000	0.053				
23	KPI_Imp_Del_rel	0.227	0.052	0.492	0.142	0.100	0.416	1.000		
		0.016	0.577	0.000	0.127	0.286	0.000			
24	KPI_Imp_Innovation	0.348	0.148	0.226	0.431	0.157	0.700	0.242	1.000	
		0.000	0.109	0.014	0.000	0.089	0.000	0.009		
25	KPI_Imp_Invoice_reduction	0.300	0.280	0.009	0.384	0.584	0.355	0.153	0.217	1.000
		0.001	0.002	0.920	0.000	0.000	0.000	0.100	0.018	

p-values below the coefficient

8.4 Group analysis

To further explore the data I conducted group analysis. Specifically the purpose of this analysis was to explore if groups that exhibited significant differences in their behavior regarding the variables used in this study could be identified. For this purpose, I created four grouping variables based on corporate strategy, procurement goals, hierarchical embedding, and procurement attention.

For corporate strategy I created a grouping variable (Technology_leader) that took the value of 1 if the company exhibited a high focus on technology leadership in its corporate strategy by responding above median to the question of the importance of technology leadership and took the value of zero otherwise. I then conducted t-tests comparing the mean of the main variables used in the study across these two groups. I focused here on reporting significant differences. The full results can be found in Appendix 4.

Statistically significant mean differences for this grouping variable were found for performance management ($p<0.0502$), trust ($p<0.0041$), exploration orientation ($p<0.0269$), balance between exploration and exploitation ($p<0.0743$), and procurement innovation performance ($p<0.000$). Organizations that focus in their corporate strategy upon technology leadership are focused more on performance management, and trust in their procurement organization, exhibit on average higher orientation towards exploration and the balance between exploration and exploitation and exhibit higher procurement innovation performance.

For procurement goals, I created a grouping variable (Innovation_focus2) that took the value of 1 if respondents had answered above median for the questions regarding the importance of Innovation or Time to market as important procurement KPIs and zero otherwise. Again I compared the mean of the main variables used in the study across these two groups with the help of t-tests.

Statistically significant mean differences for this grouping variable were found for strategic integration ($p<0.0005$), performance management ($p<0.0005$), support ($p<0.0143$), exploration orientation ($p<0.0002$), balance between exploration and exploitation ($p<0.0018$), and procurement innovation performance ($p<0.0513$). Organizations that focus on innovation and time to market as procurement KPIs tend to exhibit higher strategic integration with the corporation at large, are focused more on performance management, and support in their procurement organization, exhibit on average higher orientation towards exploration and the balance between exploration and exploitation and exhibit higher procurement innovation performance.

For hierarchical embedding, I created a grouping variable (CEO Reporting) that took the value of 1 if the highest procurement leader reported directly to the CEO and zero otherwise. Again I compared the mean of the main variables used in the study across these two groups with the help of t-tests.

Statistically significant mean differences for this grouping variable were only found for strategic integration ($p<0.0118$) and exploitation orientation ($p<0.0191$). When the procurement organization reports directly to the CEO, strategic integration also tends to be higher. Interestingly, procurement organ-

izations reporting to the CEO tend to exhibit higher orientation towards exploitation. This is surprising as one may expect that when reporting directly to the CEO, procurement has the opportunity to focus on longer term initiatives but this seems not to be the case as exploration orientation and the balance between exploration and exploitation exhibit no significant differences across both groups of organizations.

For procurement attention, I created a grouping variable (Explorer_Attention) that took the value of 1 if respondents had answered that they utilize at least 20% of their time to explore novel technologies, products and services from suppliers or experiment with new procurement ideas, practices, and processes and zero otherwise. Also for this grouping variable I compared the mean of the main variables used in the study with the help of t-tests.

For this grouping variable, statistically significant mean differences were found for centralization ($p<0.0013$), support ($p<0.0p18$), trust ($p<0.0159$) exploration orientation ($p<0.0040$), exploitation orientation ($p<0.0969$), balance between exploration and exploitation ($p<0.0007$), financial procurement performance ($p<0.0495$) procurement innovation performance ($p<0.0056$)and procurement operations performance ($p<0.0046$). Procurement managers seem to have the opportunity to spend substantial time on exploration in centralized procurement organizations and when the organization provides an organizational context of trust and support. Interestingly, attention to exploration does not seem to detract attention away from exploitation since for organizations where procurement managers spend substantial time on exploration, exploration orientation, exploitation orientation and their balance are all high. Even more interestingly time spent on exploration co-occurs with higher performance on all three performance variables used in this study suggesting that exploration may be performance enhancing.

Taken together, the results of this group analysis suggests that in addition to direct effects of the variables that will be the focus of the regression analysis, additional context variables may exist that influence exploration, exploitation, and their balance as well as procurement performance. However, given the limited sample size, a more detailed analysis of potential moderation effects of these context variables is beyond the scope of this dissertation.

9. Regression analysis

In this chapter, I present the results of the OLS regression analysis. First I present the results regarding the behavioral model. Second I present the results regarding the performance model. Finally, I discuss some robustness analyses.

9.1 Behavioral Model

Table 50 summarizes the results of the models with exploration orientation as a dependent variable. Model 1 presents results of a model containing only control variables. Coefficients are in line with expectations and all but one insignificant. Significant effects are only found for the effect of innovation as a procurement goal. Models 2 to 4 provide the results for the hypothesis tests whereas model five presents the full model with all variables.

In hypothesis 1a, I predicted that centralization is positively related to exploration orientation in procurement activities. The positive and significant coefficient in model 2 (0.190, 0=0.00855) and the weekly significant positive coefficient in model 5 (0.132, p=0.0525) provide full support for this hypothesis.

In hypothesis 2a, I predicted that strategic integration is positively related to exploration orientation in procurement activities. The positive and significant coefficient in model 3 (0.250, p=0.0097) provide some support for this hypothesis however the coefficient in the full model is insignificant, possibly due to collinearity issues. Taken together the hypothesis receives some support though weaker support then hypothesis 1.

In hypothesis 3a I predicted that contextual ambidexterity is positively related to exploration orientation in procurement activities. As discussed in the method section I tested this hypothesis separately for the three dimensions of contextual ambidexterity that prior research has identified: performance management, support, and trust. The positive and significant coefficient for performance management in model 4 (0.302, 0=0.01395) and the significant positive coefficient in model 5 (0.312, p=0.0144) support the hypothesis for this dimension of contextual ambidexterity. The results for support and trust remain insignificant.

Models 2 to 5 each provide a substantial explanation of the variance in the dependent variable. Each of the independent variable adds to the explained variance and the full model explains 46.1% of the variance in exploration orientation.

Table 50 OLS regression with exploration orientation as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5
centralization		0.190**			0.132+
		(0.0779)			(0.0799)
		0.00855			0.0525
strategic_integration			0.250**		-0.0572
			(0.104)		(0.118)
			0.0097		0.315
performance_management				0.302*	0.312*
				(0.134)	(0.139)
				0.01395	0.0144
support				0.101	0.0969
				(0.110)	(0.113)
				0.183	0.1965
trust				0.0672	0.0498
				(0.114)	(0.119)
				0.278	0.339
Productservicebin	-0.555	-0.649+	-0.741+	-0.884*	-0.869*
	(0.398)	(0.387)	(0.402)	(0.353)	(0.361)
	0.167	0.0978	0.0692	0.0150	0.0191
Country	0.00685	0.0279	-0.0145	0.262	0.260
	(0.242)	(0.235)	(0.237)	(0.212)	(0.216)
	0.978	0.906	0.952	0.221	0.232
Employees	0.271	0.279+	0.232	0.0840	0.0867
	(0.163)	(0.158)	(0.160)	(0.157)	(0.159)
	0.100	0.0806	0.151	0.594	0.587
Structural_separation5	-0.0214	-0.0365	-0.0106	0.000562	-0.0117
	(0.0592)	(0.0576)	(0.0586)	(0.0569)	(0.0582)
	0.719	0.529	0.858	0.992	0.841
KPI__Imp_Savings	-0.0979	-0.0814	-0.138	0.0715	0.115
	(0.155)	(0.150)	(0.152)	(0.163)	(0.166)
	0.531	0.590	0.368	0.662	0.493
KPI_Imp_PampL_Impact	0.145	0.158+	0.126	0.121	0.126
	(0.0922)	(0.0894)	(0.0905)	(0.0869)	(0.0884)
	0.119	0.0818	0.167	0.169	0.158
KPI_Imp_Pay_terms	-0.0201	-0.0384	-0.0472	-0.159+	-0.176+
	(0.0988)	(0.0959)	(0.101)	(0.0889)	(0.0928)
	0.839	0.690	0.641	0.0779	0.0630
KPI_Imp_Quality	0.102	0.0320	0.120	0.0551	0.0113
	(0.125)	(0.124)	(0.122)	(0.112)	(0.117)
	0.417	0.798	0.328	0.625	0.923
KPI_Imp_Stakeholder_satisf	0.0299	0.0380	0.00261	0.0564	0.0612
	(0.0947)	(0.0917)	(0.0930)	(0.0899)	(0.0913)
	0.753	0.680	0.978	0.533	0.505
KPI_Imp_Suppl_Reduction	0.144	0.119	0.137	0.124	0.0999
	(0.102)	(0.0990)	(0.0993)	(0.0948)	(0.0963)
	0.161	0.232	0.173	0.197	0.304
KPI_Imp_Time_to_market	0.111	0.0890	0.0835	0.0636	0.0478
	(0.0981)	(0.0954)	(0.0980)	(0.0877)	(0.0899)
	0.264	0.354	0.397	0.472	0.597
KPI_Imp_Del_rel	-0.108	-0.100	-0.127	-0.137	-0.116
	(0.128)	(0.124)	(0.125)	(0.120)	(0.122)
	0.402	0.422	0.313	0.259	0.346
KPI_Imp_Innovation	0.237*	0.247*	0.212*	0.239**	0.251**
	(0.0982)	(0.0951)	(0.0963)	(0.0899)	(0.0906)
	0.0183	0.0115	0.0306	0.00985	0.00752

VARIABLES Cont.	Model 1	Model 2	Model 3	Model 4	Model 5
KPI_Imp_Invoice_reduction	-0.0556	-0.0553	-0.0792	-0.0784	-0.0688
	(0.0839)	(0.0812)	(0.0834)	(0.0765)	(0.0780)
	0.510	0.498	0.345	0.310	0.381
Industry_2	-0.529	-0.386	-0.432	0.385	0.445
	(1.118)	(1.083)	(1.092)	(0.897)	(0.900)
	0.637	0.723	0.694	0.669	0.623
Industry_3	0.295	0.188	0.549	1.398	1.220
	(1.204)	(1.166)	(1.178)	(1.037)	(1.048)
	0.807	0.872	0.643	0.183	0.249
Industry_4	0.117	0.0598	0.255	1.063	0.926
	(1.225)	(1.186)	(1.195)	(1.094)	(1.101)
	0.924	0.960	0.832	0.335	0.403
Industry_5	-1.058	-1.034	-0.912	-0.0172	-0.0988
	(1.293)	(1.251)	(1.264)	(1.178)	(1.182)
	0.416	0.411	0.473	0.988	0.934
Industry_6	-0.854	-0.916	-0.395	0.810	0.602
	(1.091)	(1.056)	(1.080)	(1.045)	(1.058)
	0.436	0.389	0.716	0.441	0.572
Industry_7	0.767	0.793	0.591	1.261	1.337
	(1.509)	(1.460)	(1.472)	(1.301)	(1.305)
	0.612	0.589	0.689	0.336	0.310
Industry_8	-0.293	-0.224	0.0463	0.860	0.790
	(1.087)	(1.052)	(1.069)	(0.984)	(0.993)
	0.789	0.832	0.966	0.386	0.430
Industry_9	-0.575	-0.476	-0.154	0.129	-0.164
	(1.257)	(1.217)	(1.339)	(1.087)	(1.226)
	0.649	0.697	0.909	0.906	0.894
Industry_10	0.811	1.086	0.846	2.109+	2.186+
	(1.281)	(1.245)	(1.249)	(1.236)	(1.244)
	0.528	0.386	0.500	0.0930	0.0840
Industry_11	-0.0244	-0.149	0.304	0.704	0.476
	(1.205)	(1.167)	(1.183)	(1.028)	(1.046)
	0.984	0.899	0.798	0.496	0.651
Industry_12				1.356	1.313
				(1.326)	(1.334)
				0.310	0.329
Industry_13	-0.586	-0.554	-0.566		
	(1.556)	(1.506)	(1.518)		
	0.708	0.714	0.711		
Constant	2.039	1.453	1.853	-0.334	-0.639
	(1.683)	(1.646)	(1.644)	(1.653)	(1.669)
	0.230	0.381	0.263	0.840	0.703
Observations	99	99	98	91	90
R-squared	0.482	0.521	0.521	0.626	0.642
adjusted R-square	0.304	0.349	0.346	0.457	0.461
F	2.715	3.017	2.974	3.704	3.534
Prob > F	0.001	0.000	0.000	0.000	0.000

Standard errors in parentheses, p- values below standard errors, single tailed hypothesis tests
*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

Table 51 summarizes the results of the models with exploitation orientation as a dependent variable. Model 1 again presents results of the base model containing only control variables. For this base model several coefficients are significant. Service firms are more exploitation oriented (0.750, p=0.0355) and so are larger firms (0.257, p=0.0816). Among procurement goals, focus on profit and loss impact (0.154, p=0.0640), stakeholder satisfaction (0.301, p=0.000606), and supplier reduction (0.189, p=0.0385) increase exploitation

orientation whereas focus on delivery reliability (-0.210, p=0.0702) exhibits a negative relationship.

Table 51 OLS regression with exploitation orientation as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5
centralization		0.197**			0.0719
		(0.0687)			(0.0712)
		0.00269			0.158
strategic_integration			0.298***		0.0947
			(0.0857)		(0.105)
			0.000431		0.186
performance_management				0.280*	0.237*
				(0.124)	(0.124)
				0.0137	0.0305
support				0.213*	0.177*
				(0.102)	(0.100)
				0.02015	0.0416
trust				0.0785	0.0137
				(0.104)	(0.106)
				0.2275	0.449
Productservicebin	0.750*	0.668*	0.465	0.381	0.304
	(0.350)	(0.335)	(0.330)	(0.321)	(0.321)
	0.0355	0.0499	0.163	0.240	0.349
Country	-0.0142	-0.00281	-0.0624	0.152	0.0884
	(0.213)	(0.203)	(0.195)	(0.193)	(0.192)
	0.947	0.989	0.749	0.434	0.648
Employees	0.257+	0.263+	0.164	0.179	0.123
	(0.146)	(0.139)	(0.132)	(0.145)	(0.141)
	0.0816	0.0623	0.216	0.220	0.388
Structural_separation5	0.0719	0.0561	0.0687	0.0659	0.0379
	(0.0532)	(0.0510)	(0.0481)	(0.0524)	(0.0519)
	0.180	0.275	0.158	0.213	0.468
KPI__Imp_Savings	-0.115	-0.0929	-0.136	-0.117	-0.0556
	(0.138)	(0.132)	(0.125)	(0.147)	(0.148)
	0.409	0.483	0.279	0.430	0.709
KPI_Imp_PampL_Impact	0.154+	0.170*	0.131+	0.186*	0.172*
	(0.0821)	(0.0785)	(0.0743)	(0.0797)	(0.0788)
	0.0640	0.0340	0.0828	0.0224	0.0327
KPI_Imp_Pay_terms	0.118	0.0940	0.105	0.0170	0.0369
	(0.0858)	(0.0823)	(0.0828)	(0.0802)	(0.0827)
	0.173	0.257	0.208	0.832	0.657
KPI_Imp_Quality	0.00217	-0.0739	0.00818	-0.0981	-0.107
	(0.111)	(0.110)	(0.100)	(0.103)	(0.104)
	0.985	0.502	0.935	0.347	0.309
KPI_Imp_Stakeholder_satisf	0.301***	0.307***	0.254**	0.313***	0.297***
	(0.0841)	(0.0803)	(0.0763)	(0.0830)	(0.0813)
	0.000606	0.000276	0.00140	0.000368	0.000563
KPI_Imp_Suppl_Reduction	0.189*	0.160+	0.168*	0.178*	0.137
	(0.0898)	(0.0864)	(0.0815)	(0.0859)	(0.0858)
	0.0385	0.0677	0.0435	0.0423	0.117
KPI_Imp_Time_to_market	-0.0717	-0.0930	-0.0682	-0.0744	-0.0615
	(0.0880)	(0.0843)	(0.0804)	(0.0810)	(0.0801)
	0.418	0.274	0.399	0.362	0.446
KPI_Imp_Del_rel	-0.210+	-0.198+	-0.235*	-0.294**	-0.259*
	(0.114)	(0.109)	(0.103)	(0.110)	(0.108)
	0.0702	0.0730	0.0253	0.00963	0.0203
KPI_Imp_Innovation	0.0805	0.0941	0.0731	0.0201	0.0503
	(0.0868)	(0.0829)	(0.0790)	(0.0813)	(0.0807)
	0.357	0.260	0.358	0.806	0.536
VARIABLES Cont.	Model 1	Model 2	Model 3	Model 4	Model 5

KPI_Imp_Invoice_reduction	-0.0296	-0.0312	-0.0964	-0.0597	-0.0950
	(0.0748)	(0.0714)	(0.0684)	(0.0704)	(0.0695)
	0.693	0.663	0.163	0.400	0.177
Industry_2	-0.507	0.754	0.694	-0.389	-0.305
	(0.945)	(0.955)	(0.897)	(0.831)	(0.802)
	0.593	0.433	0.441	0.641	0.705
Industry_3	-1.237	-0.245	0.267	-0.815	-0.742
	(1.089)	(1.031)	(0.967)	(0.960)	(0.934)
	0.260	0.813	0.783	0.399	0.431
Industry_4	-0.106	0.938	1.245	0.150	0.236
	(1.120)	(1.049)	(0.981)	(1.013)	(0.981)
	0.925	0.374	0.209	0.883	0.811
Industry_5	-0.192	0.937	1.007	0.484	0.482
	(1.120)	(1.106)	(1.038)	(1.091)	(1.054)
	0.864	0.400	0.335	0.659	0.649
Industry_6	-1.810+	-0.779	-0.107	-0.853	-0.842
	(1.079)	(0.935)	(0.886)	(0.966)	(0.943)
	0.0975	0.407	0.904	0.381	0.375
Industry_7	1.285	2.421+	2.176+	0.652	0.789
	(1.357)	(1.290)	(1.208)	(1.205)	(1.163)
	0.347	0.0646	0.0761	0.590	0.500
Industry_8	-1.497	-0.327	0.0519	-0.880	-0.752
	(1.020)	(0.931)	(0.877)	(0.911)	(0.885)
	0.146	0.726	0.953	0.338	0.399
Industry_9	-0.932	0.191	1.267	-1.070	-0.438
	(1.068)	(1.038)	(1.099)	(0.940)	(1.093)
	0.385	0.854	0.253	0.260	0.690
Industry_10	-1.785	-0.412	-0.606	-1.140	-1.100
	(1.267)	(1.102)	(1.025)	(1.143)	(1.109)
	0.163	0.710	0.556	0.322	0.325
Industry_11	-0.444	0.525	1.054	-0.336	-0.309
	(1.076)	(1.033)	(0.971)	(0.950)	(0.932)
	0.681	0.613	0.281	0.725	0.742
Industry_12	-1.090			-0.587	-0.703
	(1.392)			(1.224)	(1.189)
	0.436			0.633	0.557
Industry_13		1.150	1.114		
		(1.329)	(1.246)		
		0.390	0.374		
Constant	2.294	0.593	1.088	1.288	1.121
	(1.564)	(1.458)	(1.349)	(1.531)	(1.487)
	0.147	0.686	0.423	0.403	0.454
Observations	100	100	98	92	90
R-squared	0.513	0.563	0.592	0.645	0.655
adjusted R-square	0.349	0.407	0.443	0.487	0.479
F	3.120	3.610	3.961	4.086	3.730
Prob >F	0.000	0.000	0.000	0.000	0.000

Standard errors in parentheses, p- values below standard errors, single tailed hypothesis tests
*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

Models 2 to 4 provide the results for the hypothesis tests whereas model five presents the full model with all variables. In hypothesis 1b, I predicted that centralization is positively related to exploitation orientation in procurement activities. The coefficient in model 2 (0.197, 0=0.00269) is positive and statistically significant and in the direction of the prediction. The coefficient in the full model is insignificant. Taken together the hypothesis receives some support.

In hypothesis 2b, I predicted that strategic integration is positively related to exploitation orientation in procurement activities. The positive and significant

coefficient in model 3 (0.298, p=0.000431) provides some support for this hypothesis, however, the coefficient in the full model is insignificant. Taken together the hypothesis receives some support.

In hypothesis 3b, I predicted that contextual ambidexterity is positively related to exploitation orientation in procurement activities. Again I tested this hypothesis separately for the three dimensions of contextual ambidexterity. The positive and significant coefficient for performance management in model 4 (0.280, 0=0.0137) and the significant positive coefficient in model 5 (0.237, p=0.0305) support the hypothesis for this dimension of contextual ambidexterity. The positive and significant coefficient for support in model 4 (0.213, 0=0.02015) and the significant positive coefficient in model 5 (0.177, p=0.0416) support the hypothesis also for this second dimension of contextual ambidexterity. The results for trust again remain insignificant.

Models 2 to 5 each provide a substantial explanation of the variance in the exploitation orientation of the firms in the sample. Also for this dependent variable, each of the independent variable adds to the explained variance and the full model explains 47.9% of the variance in exploitation orientation.

Table 52 summarizes the results of the models with exploration and exploitation balance as a dependent variable. Model 1 again presents results of the base model containing only control variables. Similar to the results for exploration, for this base model all but one of the coefficients are insignificant. Significant effects are only found for the effect of innovation as a procurement goal (1.718, p=0535).

Models 2 to 4 again provide the results for the hypothesis tests and model 5 presents the full model with all variables. In hypothesis 1c, I predicted that centralization is positively related to the exploration and exploitation balance in procurement activities. The positive and significant coefficient in model 2 (1.977, 0=0.00283) and the positive and significant coefficient in model 5 (1.246, p= 0.0397) provides full support for this hypothesis.

In hypothesis 2c, I predicted that strategic integration is positively related to the exploration and exploitation balance in procurement activities. The positive and significant coefficient in model 3 (2.215, p=0.0073) provides some support for this hypothesis, however, the coefficient in the full model is insignificant. Taken together the hypothesis receives some support.

In hypothesis 3c, I predicted that contextual ambidexterity is positively related to the exploration and exploitation balance in procurement activities. As for the previous dependent variables, I tested this hypothesis separately for performance management, support, and trust. The positive and significant coefficient for performance management in model 4 (2.279, 0=0.0397) and the weakly significant positive coefficient in model 5 (2.023, p=0.051) support the hypothesis for this dimension of contextual ambidexterity. The positive and significant coefficient for trust in model 4 (2.052, 0=0.03055) and the weakly significant positive coefficient in model 5 (1.387, p=0.0945) support the hypothesis also for this third dimension of contextual ambidexterity. The results for support remain insignificant across both models.

Table 52 OLS regression with balance of exploration and exploitation as dependent variable

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5
centralization		1.977**			1.246*
		(0.694)			(0.698)
		0.00283			0.0397
strategic_integration			2.215*		-0.490
			(0.885)		(1.033)
			0.0073		0.3185
performance_management				2.279*	2.023+
				(1.278)	(1.217)
				0.0397	0.051
support				0.225	0.520
				(1.047)	(0.985)
				0.415	0.2995
trust				2.052*	1.387+
				(1.076)	(1.043)
				0.03055	0.0945
Productservicebin	-5.394	-6.210+	-4.995	-7.839*	-5.850+
	(3.531)	(3.384)	(3.401)	(3.314)	(3.152)
	0.131	0.0706	0.146	0.0211	0.0684
Country	2.511	2.625	0.943	4.316*	3.099
	(2.147)	(2.050)	(2.010)	(1.990)	(1.886)
	0.246	0.205	0.640	0.0338	0.106
Employees	1.574	1.635	0.888	-0.0648	-0.497
	(1.471)	(1.405)	(1.357)	(1.494)	(1.387)
	0.288	0.248	0.515	0.966	0.721
Structural_separation5	-0.0356	-0.194	0.0247	0.245	-0.0692
	(0.536)	(0.515)	(0.496)	(0.541)	(0.508)
	0.947	0.708	0.960	0.652	0.892
KPI__Imp_Savings	-0.599	-0.382	-0.333	0.716	2.252
	(1.392)	(1.332)	(1.290)	(1.517)	(1.454)
	0.668	0.775	0.797	0.639	0.127
KPI_Imp_PampL_Impact	0.961	1.115	1.117	0.987	1.385+
	(0.828)	(0.793)	(0.766)	(0.821)	(0.772)
	0.249	0.164	0.149	0.234	0.0781
KPI_Imp_Pay_terms	0.576	0.334	-0.309	-0.652	-1.347
	(0.866)	(0.831)	(0.854)	(0.827)	(0.810)
	0.508	0.689	0.719	0.433	0.102
KPI_Imp_Quality	1.148	0.385	0.856	0.608	-0.162
	(1.123)	(1.106)	(1.034)	(1.066)	(1.020)
	0.310	0.729	0.411	0.570	0.874
KPI_Imp_Stakeholder_satisf	0.0839	0.140	-0.535	0.434	0.265
	(0.848)	(0.811)	(0.787)	(0.856)	(0.797)
	0.921	0.863	0.499	0.614	0.741
KPI_Imp_Suppl_Reduction	1.142	0.849	0.573	0.924	0.0764
	(0.906)	(0.872)	(0.841)	(0.886)	(0.842)
	0.212	0.333	0.498	0.301	0.928
KPI_Imp_Time_to_market	0.596	0.382	0.528	0.250	0.339
	(0.888)	(0.851)	(0.830)	(0.836)	(0.786)
	0.504	0.655	0.527	0.766	0.668

VARIABLES Cont.	Model 1	Model 2	Model 3	Model 4	Model 5
KPI_Imp_Del_rel	-0.990	-0.875	-0.747	-1.617	-0.862
	(1.151)	(1.100)	(1.062)	(1.134)	(1.063)
	0.393	0.429	0.484	0.159	0.421
KPI_Imp_Innovation	1.718+	1.854*	1.991*	1.641+	2.362**
	(0.875)	(0.837)	(0.816)	(0.839)	(0.791)
	0.0535	0.0299	0.0171	0.0548	0.00413
KPI_Imp_Invoice_reduction	-0.0533	-0.0697	-0.559	-0.187	-0.423
	(0.755)	(0.721)	(0.706)	(0.726)	(0.681)
	0.944	0.923	0.431	0.798	0.537
Industry_2	3.349	2.429	4.321	5.186	5.863
	(9.532)	(9.645)	(9.251)	(8.570)	(7.868)
	0.726	0.802	0.642	0.547	0.459
Industry_3	12.99	9.380	14.30	16.15	13.43
	(10.99)	(10.41)	(9.977)	(9.899)	(9.161)
	0.241	0.371	0.156	0.108	0.148
Industry_4	9.386	6.290	9.713	10.58	9.539
	(11.30)	(10.59)	(10.12)	(10.44)	(9.617)
	0.409	0.554	0.341	0.315	0.325
Industry_5	2.305	0.0692	2.730	4.338	3.448
	(11.30)	(11.17)	(10.71)	(11.25)	(10.33)
	0.839	0.995	0.799	0.701	0.740
Industry_6	0.753	-2.466	2.899	8.858	4.930
	(10.88)	(9.435)	(9.145)	(9.957)	(9.242)
	0.945	0.795	0.752	0.377	0.596
Industry_7	18.12	15.95	16.37	15.12	16.37
	(13.70)	(13.03)	(12.47)	(12.42)	(11.40)
	0.190	0.225	0.193	0.228	0.156
Industry_8	4.609	2.789	6.268	7.306	5.438
	(10.30)	(9.400)	(9.052)	(9.390)	(8.681)
	0.656	0.768	0.491	0.439	0.533
Industry_9	11.75	9.465	4.590	12.28	-0.656
	(10.77)	(10.48)	(11.34)	(9.697)	(10.72)
	0.279	0.369	0.687	0.210	0.951
Industry_10	15.48	15.69	12.93	20.13+	19.05+
	(12.79)	(11.13)	(10.58)	(11.79)	(10.87)
	0.230	0.163	0.225	0.0927	0.0850
Industry_11	6.756	2.914	8.105	6.792	2.925
	(10.85)	(10.43)	(10.02)	(9.799)	(9.140)
	0.536	0.781	0.421	0.491	0.750
Industry_12	2.627			8.919	5.480
	(14.04)			(12.62)	(11.65)
	0.852			0.482	0.640
Industry_13		-2.030	0.972		
		(13.41)	(12.86)		
		0.880	0.940		
Constant	-8.130	-11.63	-7.455	-22.86	-26.68+
	(15.78)	(14.72)	(13.92)	(15.79)	(14.58)
	0.608	0.432	0.594	0.153	0.0724
Observations	100	100	98	92	90
R-squared	0.416	0.474	0.499	0.557	0.622
adjusted R-square	0.219	0.287	0.316	0.360	0.430
F	2.108	2.535	2.722	2.830	3.236
Prob >F	0.007	0.001	0.000	0.000	0.000

Standard errors in parentheses, p- values below standard errors, single tailed hypothesis tests

*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

Models 2 to 5 each provide a substantial explanation of the variance in the balance of exploration and exploitation. Again, each of the independent variables adds to the explained variance and the full model explains 43% of the variance in the dependent variable.

A comparison of the results of the behavioral models are summarized in Table 53. Several observations emerge from a comparison of the results. First centralization receives relatively consistent support across all models as a factor that supports exploration, exploitation and their balance. While the coefficients for strategic integration in the partial models are significant for all three dependent variables, in the full models strategic integration was insignificant for all three dependent variables weakening the support for the hypothesis regarding this variable. The most interesting results emerged for the dimensions of contextual ambidexterity. Performance management received consistent and strong support across all models as a factor that supports exploration, exploitation and their balance. However, support seems to play a role only for exploitation whereas trust seems to play a role only for the balance of exploration and exploitation. These results suggest that contextual ambidexterity should not be thought of as an integrated variable but rather that the different dimensions that prior research has identified for this construct have distinct and empirically discernible effects in the context of procurement. In particular, only performance management can be thought of as an enabler to allows the organization to achieve any balance between exploration and exploitation. In contrast, the effect of support seems to be to enhance only exploitation and therefore may actually reduce the organization's ability to simultaneously pursue exploration, exploitation and their balance by biasing the organization towards exploitation. Trust may be important to enhance the balance between exploration and exploitation but may play a lower role in organizations that focus mainly on either exploitation or exploration.

Table 53 Summary of behavioral models

	Exploration	Exploitation	Balance of exploration and exploitation
Centralization	+	+	+
Strategic integration	+	+	+
Performance management	+	+	+
Support		+	
Trust			+

While models 2-5 establish the relationship between the independent variables and the three dependent variables, they do not allow to test directly if there are differences in the strength of association of each independent variable and the three dependent variables. In other words the results do not allow if for instance centralization is more strongly associated with exploration, exploitation, or the balance of exploration and exploitation. While I did not predict such differences given that there is a weak theoretical basis to do so, I explored models that allow the comparison of coefficients across dependent variables suing seemingly unrelated regression models (Zellner, 1962, Zellner, 1963, Zellner

and Huang, 1962). Seemingly unrelated regression models allow to jointly estimate several regression models, each having its own dependent variable. Particularly relevant for the present context is the ability of seemingly unrelated regression models to allow for coefficient comparison tests across the models (Cameron and Trivedi, 2010).

The results of these models that are presented in Appendix 5, suggest that no meaningful differences across coefficients other than the levels of significance reported in the main models exist. Only for centralization an almost significant difference in association exists between the balance of exploration and exploitation and both exploration ($p<0.075$) and exploitation ($p>0.09$).

9.2 Performance Models

Table 54 summarizes the results of the OLS regressions with financial procurement performance as a dependent variable. Model one presents the base model with only control variables in the model. Firms that focus on payment terms exhibit higher financial performance (0.462, p=0.00003) whereas firms that focus on supplier reduction exhibit weaker financial performance (-0.214, p= 0.0413).

In hypothesis 4-6 I had predicted that exploration, exploitation, and their balance each can exhibit a positive relationship with procurement performance. The positive and significant coefficient for exploration in model 2 (0.285, p=0.01605) provides some support for this prediction for financial performance. No support is found for exploitation in model 3. The positive and significant coefficient for the balance of exploration and exploitation in model 4 (0.0397, p=0.003305) provides some support for this prediction for financial performance. In the full model (model five) only the coefficient for the balance of exploration and exploitation remains significant (0.0781, p=0.0203). However, given the very high correlation between the exploration variable and the balance between exploration and exploitation this result needs to be interpreted with care and interpretation of the partial models would seem more appropriate.

An inspection of the adjusted R-squared values of the regression suggests that for these models, exploration (R-squared = 0.205) and the balance between exploration and exploitation (R-squared = 0.242) provide an improved explanation of variance compared to the base model (R-squared = 0.178).

Table 54 OLS regression with financial procurement performance as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5
exploration_new		0.285*			-0.288
		(0.130)			(0.314)
		0.01605			0.181
exploitation_new			-0.00295		-0.163
			(0.160)		(0.161)
			0.4925		0.1575
Balance_content_multiplicative				0.0397**	0.0781*
				(0.0141)	(0.0374)
				0.003305	0.0203
Productservicebin	0.369	0.522	0.332	0.561	0.598
	(0.402)	(0.420)	(0.425)	(0.392)	(0.440)
	0.363	0.218	0.438	0.157	0.178
Country	0.425+	0.317	0.386	0.233	0.188
	(0.242)	(0.243)	(0.245)	(0.238)	(0.245)
	0.0830	0.198	0.120	0.331	0.447
Employees	0.117	0.0691	0.110	0.102	0.191
	(0.175)	(0.173)	(0.180)	(0.167)	(0.179)
	0.507	0.691	0.545	0.543	0.291
KPI__Imp_Savings	0.227	0.194	0.210	0.155	0.0764
	(0.186)	(0.183)	(0.189)	(0.178)	(0.187)
	0.226	0.293	0.270	0.387	0.685
KPI_Imp_PampL_Impact	0.0404	0.0498	0.0608	0.0523	0.0782
	(0.110)	(0.110)	(0.118)	(0.105)	(0.114)
	0.713	0.652	0.608	0.621	0.496
KPI_Imp_Pay_terms	0.462***	0.433***	0.450***	0.405***	0.439***
	(0.102)	(0.108)	(0.105)	(0.0989)	(0.107)
	0.00003	0.000163	0.00006	0.000117	0.000124
KPI_Imp_Quality	0.0451	-0.0307	0.0245	-0.0334	-0.00285
	(0.150)	(0.149)	(0.155)	(0.145)	(0.148)
	0.764	0.838	0.875	0.818	0.985
KPI_Imp_Stakeholder_satisf	0.0226	0.0232	0.0476	0.0203	0.0816
	(0.103)	(0.104)	(0.116)	(0.100)	(0.112)
	0.827	0.824	0.683	0.840	0.469
KPI_Imp_Suppl_Reduction	-0.214*	-0.263*	-0.234*	-0.251*	-0.201+
	(0.103)	(0.103)	(0.108)	(0.0993)	(0.106)
	0.0413	0.0132	0.0344	0.0138	0.0626
KPI_Imp_Time_to_market	0.0319	0.0308	0.0500	0.0218	0.00637
	(0.106)	(0.105)	(0.108)	(0.102)	(0.104)
	0.765	0.770	0.646	0.832	0.951
KPI_Imp_Del_rel	0.118	0.106	0.0923	0.102	0.0531
	(0.137)	(0.135)	(0.144)	(0.131)	(0.138)
	0.390	0.436	0.524	0.439	0.702
KPI_Imp_Innovation	-0.0298	-0.131	-0.0482	-0.147	-0.162
	(0.103)	(0.111)	(0.106)	(0.105)	(0.110)
	0.774	0.241	0.651	0.167	0.146
KPI_Imp_Invoice_reduction	-0.0445	-0.0412	-0.0506	-0.0385	-0.0371
	(0.0907)	(0.0889)	(0.0914)	(0.0864)	(0.0872)
	0.625	0.644	0.582	0.657	0.672

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5
Industry_2	1.593	-0.755	-0.578	-0.501	-0.556
	(1.137)	(1.061)	(1.093)	(1.044)	(1.062)
	0.166	0.479	0.599	0.633	0.602
Industry_3	1.632	-0.963	-0.544	-0.862	-1.069
	(1.233)	(1.237)	(1.268)	(1.181)	(1.225)
	0.190	0.439	0.669	0.468	0.386
Industry_4	1.815	-0.774	-0.353	-0.639	-0.792
	(1.312)	(1.365)	(1.398)	(1.238)	(1.274)
	0.171	0.573	0.801	0.607	0.536
Industry_5	2.436+	0.0919	0.0943	0.254	0.292
	(1.432)	(1.396)	(1.437)	(1.317)	(1.330)
	0.0935	0.948	0.948	0.847	0.827
Industry_6	0.362	-1.940	-1.796	-1.672	-1.800
	(1.120)	(1.215)	(1.274)	(1.183)	(1.249)
	0.747	0.115	0.163	0.162	0.154
Industry_7	2.828+	-0.0324	0.581		
	(1.543)	(1.538)	(1.560)		
	0.0712	0.983	0.711		
Industry_8	1.056	-1.334	-1.128	-1.042	-1.113
	(1.119)	(1.164)	(1.212)	(1.131)	(1.183)
	0.349	0.256	0.355	0.360	0.351
Industry_9	2.029	-0.792	-0.230	-0.812	-0.536
	(1.250)	(1.392)	(1.297)	(1.143)	(1.262)
	0.109	0.571	0.860	0.480	0.673
Industry_10	2.847*	0.0233	0.681	0.142	-0.0681
	(1.331)	(1.499)	(1.534)	(1.286)	(1.385)
	0.0361	0.988	0.659	0.912	0.961
Industry_11	1.235	-1.282	-0.956	-0.982	-0.868
	(1.243)	(1.199)	(1.220)	(1.227)	(1.260)
	0.324	0.289	0.436	0.426	0.493
Industry_12		-2.431	-2.049	-1.958	-1.784
		(1.562)	(1.604)	(1.493)	(1.569)
		0.124	0.206	0.194	0.260
Industry_13	2.160			0.427	0.593
	(1.579)			(1.514)	(1.532)
	0.176			0.779	0.700
Constant	-1.384	1.411	1.195	1.966	2.798
	(1.889)	(1.960)	(2.019)	(1.691)	(1.832)
	0.466	0.474	0.556	0.249	0.132
Observations	93	91	92	92	91
R-squared	0.393	0.426	0.385	0.451	0.467
adjusted R-square	0.178	0.205	0.152	0.242	0.238
F	1.831	1.931	1.653	2.165	2.042
Prob > F	0.027	0.018	0.054	0.007	0.010

Standard errors in parentheses, p- values below standard errors, single tailed hypothesis tests

*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

Table 55 summarizes the results of the OLS regressions with procurement innovation performance as a dependent variable. Model one presents again the base model with only control variables in the model. Service firms (0.724, p=0.0565) exhibit statistically significantly higher innovation performance in procurement, Swiss firms (0.413, p=0.0712) exhibit higher innovation performance (at weak statistical significance) and firms that focus on payment terms

(0.171, p=0.0704), time to market (0.154, p=0.0930), and innovation (0.193, p=0.0360) as the procurement goals exhibit statistically higher innovation performance.

Table 55 OLS regression with innovation procurement performance as dependent variable

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5
exploration_new		0.245*			0.217
		(0.115)			(0.270)
		0.01835			0.2125
exploitation_new			0.172		0.134
			(0.137)		(0.140)
			0.106		0.171
Balance_content_multiplicative				0.0228*	0.00106
				(0.0127)	(0.0314)
				0.03885	0.4865
Productservicebin	0.724+	0.694+	0.547	0.799*	0.536
	(0.372)	(0.391)	(0.396)	(0.368)	(0.427)
	0.0565	0.0811	0.173	0.0339	0.214
Country	0.413+	0.385+	0.414+	0.336	0.393+
	(0.225)	(0.224)	(0.223)	(0.225)	(0.229)
	0.0712	0.0906	0.0690	0.140	0.0921
Employees	0.137	0.101	0.108	0.127	0.0844
	(0.148)	(0.147)	(0.149)	(0.146)	(0.154)
	0.359	0.494	0.473	0.387	0.587
KPI__Imp_Savings	0.0669	0.0574	0.0974	0.0519	0.0801
	(0.153)	(0.150)	(0.154)	(0.150)	(0.155)
	0.664	0.703	0.530	0.731	0.607
KPI_Imp_PampL_Impact	-0.138	-0.163+	-0.187+	-0.156+	-0.202*
	(0.0913)	(0.0906)	(0.0989)	(0.0903)	(0.0997)
	0.137	0.0764	0.0639	0.0884	0.0481
KPI_Imp_Pay_terms	0.171+	0.176+	0.147	0.147	0.162
	(0.0925)	(0.0956)	(0.0940)	(0.0918)	(0.0977)
	0.0704	0.0705	0.124	0.114	0.103
KPI_Imp_Quality	0.0507	0.00569	0.0286	0.0305	-0.00849
	(0.142)	(0.141)	(0.143)	(0.140)	(0.143)
	0.723	0.968	0.842	0.829	0.953
KPI_Imp_Stakeholder_satisf	-0.0646	-0.0735	-0.122	-0.0787	-0.115
	(0.0963)	(0.0955)	(0.106)	(0.0949)	(0.106)
	0.505	0.445	0.255	0.410	0.284
KPI_Imp_Suppl_Reduction	-0.0304	-0.0424	-0.0531	-0.0320	-0.0577
	(0.0905)	(0.0888)	(0.0918)	(0.0888)	(0.0928)
	0.738	0.635	0.565	0.720	0.537
KPI_Imp_Time_to_market	0.154+	0.141	0.165+	0.153+	0.149
	(0.0904)	(0.0887)	(0.0903)	(0.0887)	(0.0900)
	0.0930	0.118	0.0733	0.0908	0.103

VARIABLES Cont.	Model 1	Model 2	Model 3	Model 4	Model 5
KPI_Imp_Del_rel	-0.0844	-0.0817	-0.0413	-0.0821	-0.0485
	(0.116)	(0.114)	(0.121)	(0.114)	(0.120)
	0.471	0.475	0.733	0.475	0.687
KPI_Imp_Innovation	0.193*	0.107	0.179+	0.138	0.100
	(0.0901)	(0.0974)	(0.0903)	(0.0936)	(0.0991)
	0.0360	0.275	0.0518	0.146	0.316
KPI_Imp_Invoice_reduction	-0.0699	-0.0736	-0.0677	-0.0781	-0.0705
	(0.0789)	(0.0776)	(0.0786)	(0.0776)	(0.0784)
	0.379	0.346	0.392	0.319	0.372
Industry_2	1.126	1.086	-0.324	-0.603	-0.461
	(0.959)	(0.949)	(0.894)	(0.880)	(0.894)
	0.245	0.257	0.718	0.496	0.608
Industry_3	1.241	1.123	-0.0672	-0.652	-0.300
	(1.030)	(1.011)	(1.047)	(1.027)	(1.069)
	0.233	0.272	0.949	0.528	0.780
Industry_4	1.355	1.021	-0.219	-0.671	-0.602
	(1.259)	(1.247)	(1.263)	(1.271)	(1.281)
	0.286	0.416	0.863	0.599	0.640
Industry_5	1.747	1.766	0.199	0.0411	0.132
	(1.133)	(1.121)	(1.092)	(1.080)	(1.088)
	0.129	0.121	0.856	0.970	0.904
Industry_6	-0.376	-0.199	-1.574	-2.002+	-1.548
	(0.929)	(0.913)	(1.064)	(1.007)	(1.075)
	0.687	0.828	0.144	0.0515	0.156
Industry_7	0.963	0.614	-0.707	-1.104	-1.078
	(1.285)	(1.270)	(1.266)	(1.276)	(1.284)
	0.457	0.631	0.579	0.390	0.405
Industry_8	0.317	0.401	-0.927	-1.365	-0.979
	(0.923)	(0.905)	(1.008)	(0.961)	(1.018)
	0.732	0.659	0.362	0.161	0.340
Industry_9	1.016	0.986	-0.470	-1.087	-0.510
	(1.061)	(1.105)	(1.066)	(1.089)	(1.219)
	0.342	0.376	0.661	0.322	0.677
Industry_10	1.601	1.357	0.445	-0.399	0.0848
	(1.103)	(1.086)	(1.266)	(1.227)	(1.312)
	0.152	0.216	0.727	0.746	0.949
Industry_11	0.495	0.432	-0.940	-1.259	-1.088
	(1.043)	(1.023)	(1.008)	(0.993)	(1.016)
	0.637	0.674	0.355	0.210	0.289
Industry_12			-1.312	-1.661	-1.414
			(1.328)	(1.294)	(1.347)
			0.327	0.204	0.298
Industry_13	1.579	1.662			
	(1.317)	(1.303)			
	0.236	0.207			
Constant	1.076	1.136	2.315	3.156+	2.519
	(1.649)	(1.614)	(1.680)	(1.660)	(1.740)
	0.517	0.484	0.174	0.0623	0.153
Observations	84	83	84	84	83
R-squared	0.376	0.414	0.392	0.409	0.423
adjusted R-square	0.122	0.156	0.131	0.154	0.140
F	1.480	1.608	1.498	1.603	1.496
Prob >F	0.112	0.0703	0.104	0.0708	0.103

Standard errors in parentheses, p- values below standard errors, single tailed hypothesis tests

*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

The positive and significant coefficient for exploration in model 2 (0.245, p=0.01835) provides some support for the prediction that exploration exhibits a positive relationship with innovation performance. No support is found for exploitation in model 3. The positive and significant coefficient for the balance of exploration and exploitation in model 4 (0.0228, p=0.0127) provides some support for the prediction that the balance of exploration and exploitation exhibits a positive relationship with innovation performance. In the full model (model 5) none of the coefficients remains significant. This result is likely due to multicollinearity and therefore I decided to interpret results based on the partial models.

An inspection of the adjusted R-squared values of the regression suggests that for these models, exploration (R-squared = 0.156) and the balance between exploration and exploitation (R-squared = 0.154) provide an improved explanation of variance compared to the base model (R-squared = 0.122) but the improvement is more modest compared to the results for financial performance. Also the results for the F statistic are marginal and suggest an overall marginal fit of the model with the data. Taken together these results suggest some support regarding the effects of exploration and the balance of exploration and exploitation on procurement innovation performance.

Table 56 summarizes the results of the OLS regressions with procurement operational performance as a dependent variable. Model one presents the base model with only control variables in the model. Except for some marginal industry effects none of the variables is significant.

Model two suggests a positive effect (at weak statistical significance) for exploration (0.181, p=0.0735) that provides some support for the prediction that exploration exhibits a positive relationship with operational performance. Again, no support is found for exploitation in model 3. The positive and significant coefficient for the balance of exploration and exploitation in model 4 (0.0231, p=0.04965) provides some support for the prediction that the balance of exploration and exploitation exhibits a positive relationship with operational performance. In the full model (model 5) none of the coefficients remains significant. The results of the explained variance and overall model fit (F-statistic) suggest that the support is weak at best. The overall explained variance for exploration (R-squared = 0.0319) and the balance between exploration and exploitation (R-squared = 0.0445) are very small. More importantly the F statistic suggests that the overall models does not provide an improved fit over and intercept only model.

Table 56 OLS regression with operations procurement performance as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5
exploration_new		0.181+			-0.0275
		(0.124)			(0.303)
		0.0735			0.464
exploitation_new			0.129		0.0596
			(0.150)		(0.158)
			0.1955		0.354
Balance_content_multiplicative				0.0231*	0.0252
				(0.0138)	(0.0359)
				0.04965	0.2425
Productservicebin	0.566	0.706+	0.487	0.716+	0.629
	(0.393)	(0.424)	(0.411)	(0.400)	(0.449)
	0.154	0.1000	0.240	0.0775	0.165
Country	0.288	0.280	0.315	0.245	0.258
	(0.239)	(0.246)	(0.244)	(0.243)	(0.253)
	0.233	0.259	0.201	0.317	0.310
Employees	-0.0591	-0.0960	-0.0868	-0.0772	-0.0825
	(0.161)	(0.165)	(0.166)	(0.161)	(0.173)
	0.715	0.561	0.603	0.632	0.636
KPI__Imp_Savings	0.0815	0.0978	0.101	0.0812	0.0843
	(0.158)	(0.159)	(0.160)	(0.157)	(0.164)
	0.607	0.541	0.530	0.607	0.609
KPI_Imp_PampL_Impact	0.0172	-0.00855	-0.0202	-0.00900	-0.0261
	(0.0973)	(0.100)	(0.105)	(0.0982)	(0.107)
	0.860	0.932	0.849	0.927	0.809
KPI_Imp_Pay_terms	0.0735	0.0797	0.0616	0.0696	0.0696
	(0.100)	(0.106)	(0.104)	(0.101)	(0.109)
	0.466	0.456	0.555	0.491	0.526
KPI_Imp_Quality	0.217	0.186	0.204	0.189	0.183
	(0.138)	(0.141)	(0.141)	(0.139)	(0.144)
	0.120	0.192	0.154	0.179	0.208
KPI_Imp_Stakeholder_satisf	-0.0809	-0.101	-0.125	-0.0919	-0.102
	(0.0925)	(0.0964)	(0.103)	(0.0936)	(0.109)
	0.385	0.299	0.233	0.329	0.353
KPI_Imp_Suppl_Reduction	0.00796	-0.0103	-0.00726	-0.000631	-0.00647
	(0.101)	(0.104)	(0.105)	(0.101)	(0.109)
	0.937	0.921	0.945	0.995	0.953
KPI_Imp_Time_to_market	-0.0444	-0.0533	-0.0444	-0.0503	-0.0491
	(0.103)	(0.105)	(0.105)	(0.104)	(0.106)
	0.669	0.613	0.674	0.629	0.645
KPI_Imp_Del_rel	0.0372	0.0500	0.0801	0.0454	0.0612
	(0.132)	(0.134)	(0.141)	(0.133)	(0.142)
	0.780	0.711	0.571	0.733	0.669
KPI_Imp_Innovation	0.0244	-0.0162	0.0219	-0.0197	-0.0274
	(0.102)	(0.111)	(0.104)	(0.107)	(0.113)
	0.811	0.884	0.834	0.854	0.808
KPI_Imp_Invoice_reduction	0.0648	0.0641	0.0724	0.0595	0.0650
	(0.0893)	(0.0907)	(0.0903)	(0.0890)	(0.0919)
	0.470	0.482	0.426	0.506	0.482

VARIABLES Cont.	Model 1	Model 2	Model 3	Model 4	Model 5
Industry_2	-1.112	-1.169	1.314	1.374	0.942
	(1.056)	(1.063)	(1.139)	(1.119)	(1.097)
	0.296	0.275	0.252	0.223	0.394
Industry_3	0.139	-0.0547	2.640*	2.421+	2.045
	(1.220)	(1.237)	(1.228)	(1.219)	(1.273)
	0.910	0.965	0.0350	0.0509	0.113
Industry_4	-1.820	-1.973	0.670	0.555	0.169
	(1.340)	(1.353)	(1.310)	(1.294)	(1.332)
	0.179	0.149	0.610	0.669	0.899
Industry_5	-0.996	-0.954	1.394	1.535	1.061
	(1.262)	(1.272)	(1.331)	(1.300)	(1.264)
	0.432	0.456	0.299	0.242	0.404
Industry_6	-2.327+	-2.366+	0.254	0.195	-0.127
	(1.199)	(1.216)	(1.119)	(1.100)	(1.295)
	0.0562	0.0557	0.821	0.860	0.922
Industry_7	-1.687	-1.933	0.578	0.507	
	(1.505)	(1.525)	(1.570)	(1.530)	
	0.266	0.209	0.714	0.741	
Industry_8	-1.502	-1.600	1.055	0.962	0.624
	(1.146)	(1.162)	(1.105)	(1.089)	(1.217)
	0.194	0.173	0.343	0.380	0.610
Industry_9	-0.941	-1.258	1.444	1.163	0.880
	(1.255)	(1.430)	(1.272)	(1.269)	(1.375)
	0.456	0.382	0.260	0.363	0.524
Industry_10	-2.045	-2.365	0.570	0.165	-0.111
	(1.426)	(1.465)	(1.315)	(1.304)	(1.431)
	0.156	0.111	0.666	0.900	0.939
Industry_11	-1.272	-1.431	1.149	1.145	0.741
	(1.190)	(1.206)	(1.237)	(1.217)	(1.290)
	0.289	0.239	0.356	0.350	0.568
Industry_12	-2.468	-2.685+			-0.333
	(1.549)	(1.572)			(1.626)
	0.115	0.0921			0.838
Industry_13			2.328	2.597+	2.110
			(1.577)	(1.542)	(1.554)
			0.144	0.0965	0.179
Constant	3.444*	3.321+	0.727	1.127	1.469
	(1.723)	(1.768)	(1.766)	(1.749)	(1.725)
	0.0493	0.0646	0.682	0.521	0.397
Observations	98	96	97	97	96
R-squared	0.266	0.287	0.273	0.293	0.295
adjusted R-square	0.0253	0.0319	0.0173	0.0445	0.0145
F	1.105	1.125	1.068	1.179	1.052
Prob >F	0.361	0.341	0.401	0.289	0.420

Standard errors in parentheses, p- values below standard errors, single tailed hypothesis tests
*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

Table 57 provides a comparison of the models. Exploration and the balance of exploration and exploitation contribute to financial and innovation performance in procurement and weakly to operational performance. Surprisingly, exploitation exhibits no relationship to any of the three dimensions of procurement performance (financial procurement performance, innovation procurement performance, and operational procurement performance) investigated in this study. This result is unexpected given that exploitation orientation (and the focus on short-term incremental goals that it implies) has been the traditional focus of procurement activities.

The results should be viewed in light of the fact that according to the descriptive analysis, the majority of the firms in my sample exhibit a very high focus on exploitation and lower emphasis on exploration and therefore also on the balance between exploration and exploitation. Similar to prior research on the balance between exploration and exploitation (Benner and Tushman, 2003, Uotila, Maula, Keil and Zahra, 2009), the results may therefore be interpreted such that the firms I studied are relatively far on the exploitation side of a balance between exploration and exploitation (which is not optimal for performance) and therefore any higher exploration and more balanced approach to exploration and exploitation is associated with higher performance whereas an even higher focus on exploitation does not provide any further performance benefits.

Table 57 Summary of results for performance models

	Financial Performance	Innovation Performance	Operational Performance
Exploration	+	+	+(weak result)
Exploitation			
Balance of exploration and exploitation	+	+	+(weak result)

Following the same logic as in the behavioral model, for the performance model I also ran seemingly unrelated regression models to test for differences in association of the independent variables (exploration, exploitation, and the balance between across the three dependent variables. The results of these models are summarized in Appendix 6. Also for the performance models no significant differences in the strength of association exist across the dependent variables.

9.3 Robustness analyses

One of the key constraints in the present analysis has been the limited number of observations that creates limitations to the number of variables that can be included in the regression model. To test the robustness of the results to alternative specifications, I took several steps. First, I rerun the regression models with different combinations of control variables. In these additional robustness analysis, I also included additional control variables that were discussed in the descriptive analysis to test the robustness of the results to these control variables. Specifically, I tested models including corporate strategy, procurement strategy, hierarchical embeddedness, and functional embeddedness as alternative control variables testing models with different combinations of these additional control variables and the control variables in the models presented as the main analysis. Results remained qualitatively similar and robust to these alternative specifications of the model.

I further ran a set of structural equation models that tested the full path model as an additional specification. The results of these models are presented in Appendix 7. For these models I used the same summary variables used in the regression analysis but as is common practice, left control variables out to keep

the model size manageable. The central advantage in the context of the present study of such a structural model is that it (1) allows to model complex multistage dependence relationships where variables can be simultaneously dependent variables and independent variables, (2) allows to simultaneously examine multiple dependent variables and (3) allows to include unmeasured latent variables in the models (Acock, 2013, Bollen, 1989, Hair, Black, Babin and Anderson, 2010, Schumacker and Lomax, 2010, Shook, Ketchen, Hult and Kacmar, 2004). However, as discussed in the methods section, the sample size in this dissertation is below the needed sample size for a model of the complexity as I am testing here and therefore results need to be interpreted with caution.

Some researchers have suggested partial least square (PLS) models as a remedy for testing structural models with limited sample size. However, recent research shows that such PLS models, in particular when the constructs are observed variables as in my case, result in identical coefficients when compared with OLS regressions estimated separately for each path and therefore provide no advantage (Goodhue et al., 2012, Rönkkö et al., 2015). More importantly, partial least square models have been severely criticized in the recent literature (Guide and Ketokivi, 2015, Rönkkö and Evermann, 2013, Rönkkö, McIntosh and Antonakis, 2015, Rönkkö et al., 2016) pointing to several critical flaws in the methodology and even calling for a moratorium in the use of these methods until methodological issues have been worked out (Rönkkö, McIntosh, Antonakis and Edwards, 2016). Given these concerns I have chosen not to employ partial least square models and rather rely on structural equation models as a robustness test.

The results of the SEM models provide further support for the results presented in the main regression analysis. However, also these structural models suffer from the same multicollinearity problem related to the exploration and balance of exploration and exploitation variables. In structural equation models high levels of multicollinarity may lead to similar problems of insignificant coefficient estimates, flipping direction of coefficients, and unstable parameter estimates (Grewal et al., 2004, Jagpal, 1982). These problems are present in the full model that includes both exploration and the balance of exploration and exploitation. A comparison test of a set of reduced models that are weaker in overall model fit again provides results that resemble the partial models of the regression analysis. In summary while the small sample size and multicollinearity problems make the structural equation models unsuitable as a main analysis, the results from the robustness analyses with this modelling approach further support the results from the main regression analysis presented in this dissertation.

10. Discussion

This final chapter of the dissertation starts with a brief summary of the core theoretical arguments and findings. Next, I will develop implications for theory and pointers for practice. Finally, I will discuss limitations of the work and suggest areas for further research.

10.1 Summary of the key argument and findings

Given the increased importance of procurement in corporations and the shift of focus from purely short term goals and operational focus towards a mix of short-term and long-term goals and a broader strategic agenda, in this dissertation I set out to investigate organizational antecedents and performance consequences of exploration, exploitation and their balance in procurement.

Drawing upon a review of the procurement literature and prior research on ambidexterity I formulated behavioral hypotheses regarding three antecedents of exploration and exploitation: centralization of procurement activities, strategic integration, and contextual ambidexterity. Specifically, I hypothesized that procurement centralization would increase exploitation orientation given the efficiency and scale benefits. I further predicted centralization to increase exploration orientation given the fact that it allows critical mass and coordination across projects. Finally, I predicted procurement centralization to facilitate the balance of exploration and exploitation given that centralization supports coordination and the resolution of conflicts which are central to balancing the trade-offs between these two orientations. The empirical results from a survey of 118 industrial organizations in Finland and Switzerland provides supporting evidence regarding the prediction for exploration and the balance of exploration and exploitation. For exploitation, I found some evidence for a significant positive relationship in line with my prediction.

Regarding strategic integration, I hypothesized a positive effect on exploration orientation given that strategic integration is likely to increase the focus on long-term goals such as innovation. I also predicted a positive relationship with exploitation given that strategic integration is likely to allow the procurement organizations to deliver impact on short-term strategic projects. Finally, I expected a positive relationship of strategic integration with the balance between exploration and exploitation given that strategic integration is instrumental to

providing the necessary information that allows procurement personnel to manage the trade-offs between short-term and long-term goals. The empirical evidence from the survey provided support for all three hypotheses.

For contextual ambidexterity I hypothesized a positive relationship with exploration, exploitation and their balance given that the mechanisms underlying contextual ambidexterity represent universal mechanisms that should be independent of the specific strategic orientation. This prediction was tested using three dimension that prior research (Gibson and Birkinshaw, 2004) suggests to form contextual ambidexterity. The empirical evidence suggests a more complex picture than I predicted. The performance management dimension of contextual ambidexterity is positively related to exploration, exploitation and their balance as I hypothesized. However, the support dimension of contextual ambidexterity is only related to exploitation whereas the trust dimension of contextual ambidexterity is only related to the balance of exploration and exploitation.

In addition to these behavioral predictions I also developed hypotheses regarding the performance implications of exploration, exploitation and their balance. Specifically, I predicted each of these orientations to be positively related to procurement performance given that they support accomplishing different organizational goals. Specifically, I predicted exploitation activities to be positively related to procurement performance since it allows the organization to address short-term goals. Exploration can be expected to be positively related to procurement performance since it enables achieving longer term goals. Finally, the balance between exploration and exploitation can be expected to enable the organization striking a balance between these two set of goals. In my empirical tests, I tested separate models with financial performance, innovation performance, and operational for performance. Results provide evidence that exploration and the balance of exploration and exploitation are positively related to financial performance and innovation performance. Contrary to my predictions exploitation did not exhibit a relationship with any of the performance dimensions.

A summary of the results is depicted in Figure 5. In this figure only relationships that received statistical support are depicted. All depicted relationships are positive.

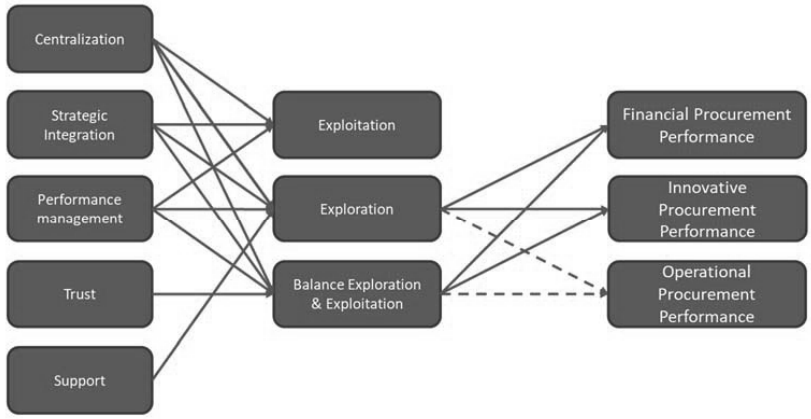

Figure 5 Summary of empirical results

10.2 Implications for theory

The arguments and results developed in this dissertation have implications for two broad bodies of literature. First and foremost, my results add novel insights to the procurement literature. Specifically, my arguments derived from an organization theoretical perspective and the findings of my empirical study contribute to research streams on the strategic role of procurement in the organization, to literature on early supplier involvement in innovation, to the discourse on organizational design of procurement and finally and most broadly to the discourse on theoretical perspectives underlying procurement research.

Second, my argument and results add to the literature on organizational ambidexterity. In particular, I develop novel insights to our understanding of contextual ambidexterity within functional units thereby complementing prior research that has focused mostly on the corporate level.

Implications for the strategic role of procurement in the organization. The procurement literature has long argued that procurement organizations have become strategic functions for the corporation and at least have the potential to become a contributor to corporate competitive advantage (Chen, Paulraj and Lado, 2004, den Butter and Linse, 2008, Gottfredson, Puryear and Phillips, 2005, Mol, 2003). However, there continues to be a considerable confusion in the literature and what such a strategic contribution would be and what are antecedents necessary to provide it and the benefits it will create for the organization. By introducing the distinction of exploration and exploitation to the procurement literature, this dissertation provides one perspective to conceptualizing procurement's strategic contributions that is well accepted in the strategic management literature and therefore may help in moving forward the discourse by providing a set of concepts around which future research may theorize.

My findings regarding the relationship between exploration orientation and the balance of exploration and exploitation on procurement financial performance and innovation performance suggest that innovation and balancing of long-term and short-term orientation provide impact to procurement performance and are strategically important. Particularly interesting in this context is the finding that exploitation shows no relationship with the procurement performance dimensions I measured. Combined with the finding from the descriptive analysis that the organizations in my sample seem to exhibit a higher focus on exploitation then on exploration suggest that most procurement organizations are over-focused on short-term goals and exhibit too little focus on long-term goals to the detriment of the overall procurement performance. In more theoretical terms, similar to prior research at the organizational level (Benner and Tushman, 2003, Uotila, Maula, Keil and Zahra, 2009) one may interpret these findings such that the organizations are not at the optimal level of exploration and exploitation and a shift towards more exploration may lead to higher performance. However, such an interpretation would be based on the view of a fundamental trade-off between exploration and exploitation that is not fully supported by the positive correlation between exploration and exploitation found in my data. Rather, taken together the findings suggest that optimal procurement performance may arise when organizations maintain a balance of exploration and exploitation that maintains high levels on both orientations.

My arguments and findings that exploration, exploitation, and their balance are influenced by centralization of procurement, strategic integration, and contextual ambidexterity and its sub-dimensions suggest that organizational levers exist to focus procurement organization on different type of goals despite the strong embeddedness of procurement in the overall organizational design. These organizational levers can be utilized by procurement managers to drive both short term and long term goals of procurement through exploration and exploitation orientation.

My arguments also make contributions to prior research in procurement that has focused on the important roles of centralization and strategic integration. Centralization and strategic integration are among the most studied constructs in the literature on procurement organizations (e.g., Carr and Pearson, 1999, Carr and Pearson, 2002, Carr and Smeltzer, 1997, Carr and Smeltzer, 1999, Chen, Paulraj and Lado, 2004, Corey, 1978, Das and Narasimhan, 2000, Faes, Matthyssens and Vandenbempt, 2000, Glock and Hochrein, 2011, Gonzalez-Benito, 2007, Hartmann, Trautmann and Jahns, 2008, Narasimhan and Das, 2001, Paulraj, Chen and Flynn, 2006). However, findings have been mixed (Glock and Hochrein, 2011). Research on centralization has identified arguments for both centralization and decentralization. Similarly research on strategic integration has argued for the importance of strategic integration but found at the same time that organizations seem to have problems in achieving such integration. My findings suggest a novel strategic benefit of centralization in allowing exploration, exploitation and their balance and thereby contributing indirectly to procurement performance. My findings also suggest that at least in

a subset of the organizations in my sample such strategic integration was present and indirectly enabled procurement performance through its effect on exploration, exploitation and their balance.

Implications for procurement role in innovation. My dissertation also makes important contributions to the discourse on the role of procurement in corporate innovation. Despite a vibrant stream of research that has identified the important role of procurement in corporate innovation, for instance, through early supplier involvement (e.g., Bidault and Despres, 1998, Hartley, Meredith, McCutcheon and Kamath, 1997, Hommen and Rolfstam, 2009, Johnsen, 2009, Petersen, Handfield and Ragatz, 2003, Petersen, Handfield and Ragatz, 2005, Schiele, 2010, Takeishi, 2001), innovative supplier search (e.g., Schiele, 2006), or supplier innovation management (Aminoff, Kaipia, Pihlajamaa, Tanskanen, Vuori and Makkonen, 2016) most research still suggests that the majority of procurement activities continues to be focused on short-term goals and oriented towards activities and key performance indicators that relate to exploitation (Benner and Tushman, 2002) –a finding that is also replicated in my empirical results. This suggests that our understanding of the factors that enable procurement to make a substantial contribution to corporate innovation while at the same time pursuing traditional procurement goals continues to be incomplete.

My dissertation makes two important contributions to this stream of research. First, my arguments and results suggest that with centralization of procurement, its strategic integration and an organizational culture and climate focusing on performance management three specific antecedents exist that facilitate an orientation towards exploration in procurement. It thereby complements and expands prior research that has emphasized the role of organizational design elements in supporting procurements contribution to innovation (de Figueiredo and Teece, 1996, Schiele, 2010). Interestingly, while prior case-based research (Schiele, 2010) has emphasized the importance of segregating innovation related procurement activities from cost related activities to enable early supplier integration, my study did not find a similar effect of such structural separation on exploration but rather provides evidence for the advantages of the contextual ambidexterity perspective suggested by Gibson and Birkinshaw (2004). These differences may be explained by the wider scope of my study and suggest that future research may investigate differences in the benefits of structural separation in more narrowly scoped contexts as the advantages of structural separation may not transfer from the organizational level of analysis to the functional unit level.

A second contribution of my study to the role of procurement in innovation is in emphasizing the overall importance of balancing exploration and exploitation in procurement activities. Prior case-based work by Schiele (2010) and others (Johnsen et al., 2012, Prajogo et al., 2008) proposes a dual role of procurement in contributing to innovation and managing overall cost in the context of early supplier integration but also suggested that existing research does not provide much insights in how organizations can accomplish this dual role (Phillips

et al., 2006). My study reinforces the idea that this dual role of procurement reflects the exploration exploitation distinction made by March (1991) and further builds on this idea by showing that the notion of balancing exploration and exploitation in corporate procurement contributes to procurement's innovative performance. To contribute to procurement innovation, procurement managers need to counter the natural tendency in procurement activities to over-emphasize exploitation and consciously work towards a balance between exploration and exploitation (Benner and Tushman, 2002). In addition, my study identifies four distinct antecedents that facilitate accomplishing this balance: centralization of procurement activities, strategic integration, and the performance management as well as the trust sub-dimensions of contextual ambidexterity.

Implications for literature on ambidexterity in organizational units. In addition to the contributions to the procurement literature, my results have implications to a broader organizational context. Specifically, my dissertation also makes important contributions to the literature on ambidexterity in organizational units or organizational functions. Most research and organizational ambidexterity has been conducted on the organizational level of analysis (Lavie, Stettner and Tushman, 2010, Raisch, Birkinshaw, Probst and Tushman, 2009). In particular, the work on separating exploration and exploitation may be most applicable at the firm level of analysis. By taking a unit and more specifically function level of analysis, my work links to a small stream of studies that has begun to investigate how organizations achieve ambidexterity within specific sub-units of the organization (Gibson and Birkinshaw, 2004, Jansen et al., 2012, Kristal, Huang and Roth, 2010, O'Reilly and Tushman, 2008, Simsek, Heavey, Veiga and Souder, 2009). Achieving ambidexterity on the unit or functional level may be particularly challenging given that organizational leaders are more constrained in their choices regarding structure in management systems as these units tend to be embedded in a larger context. Furthermore, the limited size of organizational units such as corporate procurement may make tried-and-tested mechanisms such as structural separation more difficult, if not impossible, to implement in procurement.

My first contribution to this literature is in showing the important role that contextual ambidexterity and its sub-dimensions play for exploration, exploitation, and their balance in the context of corporate procurement. The study thereby complements prior studies on contextual ambidexterity on the unit level (e.g., Gibson and Birkinshaw, 2004). Particularly interesting regarding the findings on contextual ambidexterity is the fact that the sub-dimensions of contextual ambidexterity play clearly distinct roles. My results suggest that only performance management is a universal lever to support exploration orientation, exploitation orientation, and their balance. In contrast the support and trust sub-dimensions may have a role only for some of the orientations. These findings suggest that research on contextual ambidexterity should utilize the sub-dimensions of this construct in separation to gain a deeper understanding of when and how these elements are effective in creating the desired orientation of activities.

My arguments and findings further identify two novel antecedents to the balance between exploration and exploitation. Centralization of a corporate function and strategic integration have not been investigated in prior research as potentially important drivers of the balance between exploration and exploitation. Centralization and strategic integration may be equally important to achieve balance in other functions that face similar constraints as procurement such as human resources or supply chain management and where a balance between exploration and exploitation can contribute to performance (Kristal, Huang and Roth, 2010). Furthermore, while the limitations of my sample did not permit to run more complex models, these findings suggest that configurations of different antecedents of ambidexterity may exist that jointly allow the organization to balance exploration and exploitation within organizational units. However, investigating such configurations is up to future studies that can draw on larger samples and have the power to test such configurational models (Meyer et al., 1993).

However, generalization may need to be considered with care. My arguments and findings from the regression analysis as well as the group analysis suggest that modes of organizational ambidexterity on the unit level may differ across organizational contexts and that therefore more fine grained theorizing on organizational ambidexterity on the level of specific organizational contexts may be required (Lavie, Stettner and Tushman, 2010). For instance, while centralization and strategic integration may generalize to other functions that are tightly integrated with business units, centralization and strategic integration are unlikely to play a similar role in units that are less tightly integrated with other units in the organization. More broadly, this argument implies that organizational context matters for the applicability of different antecedents to exploration and exploitation since it creates specific constraints that may either enable or limit the applicability of modes of ambidexterity discussed in the broader organizations literature and future research may need to develop more context specific theorizing.

10.3 Implications for practice

My arguments have a number of implications for leaders in procurement. In conversations senior procurement managers often mention a broad set of goals they aim to pursue, however, at the same time mention the intense constraints they face in implementing those goals given the strong pressures from the organization at large to focus on short-term calls such as procurement cost savings. This tension is also reflected in the data regarding the importance of different procurement goals in the organizations I studied and in the data on the time used for different procurement goals by the respondents. My results regarding the performance benefits of an increased orientation towards exploration and balancing of exploration and exploitation provide an important argument in this dialogue between procurement managers in the organization at large. Pursuing long-term goals and balancing short-term and long-term goals

in procurement simply makes business sense and also enriches the opportunity of the financial performance contribution that procurement is able to make.

The results of my dissertation also provide a number of mechanisms that procurement managers and the organization at large can utilize to steer their procurement organizations to what is enabling higher rates of exploration orientation and the balance between exploration and exploitation. These mechanisms relate to structure, process, and organizational climate.

Regarding procurement structure, my findings suggest that structural separation plays a negligible role in supporting exploration, exploitation, and their balance in procurement and that procurement leaders should rather put their focus on the degree of centralization of procurement activities when thinking of how to optimize the balance between short-term and long-term objectives. Centralization may be important to ensure sufficient critical mass and allows procurement professionals to focus on core procurement tasks rather than being forced to participate in a large number of additional tasks as may be the case when major parts of procurement resources are more tightly integrated with business units than with their home function.

Strategic integration on the other hand relates to the process of how procurement works with the rest of the organization and is strongly influenced by the organization at large. In fact, by fostering strategic integration the organization at large may be able to support procurements efforts to focus on long-term goals and even steer procurement activities toward stronger consideration of goals such as innovation and learning. This finding would seem important in the light of recent research that suggests that procurement continues to be poorly integrated into strategic decision-making (Knoppen and Saenz, 2015).

The third mechanism, contextual ambidexterity and its sub-dimensions, is of particular importance for the chief procurement officer and other senior procurement leaders. Contrary to the structure of procurement and its integration with other activities which are often constrained by the overall organization procurement is embedded in, contextual ambidexterity would seem to be mostly under the control of senior leaders in the procurement organization. Creating a climate of strong performance orientation in the procurement organization and to a lower extent a climate that is characterized by support and trust may be levers that procurement leaders can utilize to achieve exploration, exploitation, and their balance without changing the overall structure of the procurement organization. However, managing through the soft factors that are central to contextual ambidexterity may be more time consuming and require continued managerial attention. Compared to alternative mechanisms to achieve a balance between exploration and exploitation, for instance, structural changes that require relatively limited time change processes or strategic integration which may be achievable at least partly through the definition of processes and therefore may require only limited attention once these processes are implemented, creating an organizational climate that leads to a strong performance orientation and creates an environment high on support and trust requires an on-going commitment of time and attention on the side of the chief procurement officer and other procurement leaders. To manage through contextual ambidexterity,

the procurement leaders are asked to step up and lead by example to maintain a strong personal focus on performance orientation, support and trust.

10.4 Limitations of the study and areas for future research

In this dissertation, several limitations need to be acknowledged. The first and foremost limitation of the dissertation may be the limited sample size that has forced the use of relatively simple techniques such as multiple regression instead of stronger techniques such as structural equation modeling as the main method of analysis. The limited sample size also caused restrictions in the complexity of the regression models that could be tested. Future research should therefore replicate the current study utilizing larger samples.

A second limitation that is partially also connected with the sample size just discussed arises from the focus on only two relatively small European countries. While there is no reason to believe that relationships would fundamentally vary in different geographies, future research should replicate my results in other geographies. In particular, it would seem to be important to replicate the results in North American and Asian settings where business practices may vary more strongly than in other European countries.

A third limitation arises from the relatively large size of the firms in my sample that may somewhat reduce generalizability to smaller firms. Procurement in small organizations often takes a very different form since procurement may be in the hands of a single or only a small number of individuals. Many of the arguments developed in this thesis may not fully apply in small and medium-sized organizations (that is organizations with less than 250 employees).

Another limitation concerns the focus on procurement performance as the only performance outcome measured in the present study. An interesting research question that the present study needs to leave to future research concerns the effect of procurement performance on corporate performance. Specifically, future studies should investigate if exploration, exploitation, and their balance indirectly also have direct and indirect effects on corporate performance. It may very well be that exploration, exploitation, and their balance in procurement may have direct effects on corporate performance in addition to affecting performance through their effect on procurement performance given that procurement activities tend to also affect how activities in business units are carried out.

In the behavioral model I focused on three variables as predictors of exploration, exploitation, and their balance that where derived from the procurement literature and organization: centralization of procurement activities, strategic integration, and contextual ambidexterity. Additional variables from each domain may have an influence on exploration, exploitation and their balance. In particular, from the procurement literature, future research may investigate the effects of standardization, specialization, configuration, involvement, and formalization (Glock and Hochrein, 2011).

While the current study investigated the effects of contextual ambidexterity controlling for structural separation, I did not investigate domain separation or

temporal separation, two additional mechanisms to achieve ambidexterity on the corporate level that have received substantial interest in the research on ambidexterity. In particular domain separation for instance separating the development of processes and practices from the content of procurement may be a worthwhile avenue for future research on ambidexterity in procurement. Given that procurement, similarly to alliances where domain separation has been previously studied (Lavie, Kang and Rosenkopf, 2011, Lavie and Rosenkopf, 2006), can support a broader set of corporate goals rather than being focused on a single goal makes domain separation a particularly interesting approach for this function.

Additional contextual variables may affect the relationships studied in this dissertation. For instance, the overall firm orientation to innovation may affect the emphasis on exploration and exploitation in procurement. Also context variables on the level of the procurement organization such as the maturity of the procurement organization (Schiele, 2007) may affect exploration and exploitation orientation. Future research should therefore investigate the effects of such contingencies on the results presented in this dissertation.

Given the cross-sectional design of the study I could not investigate how organizations arrive at the specific configurations of centralization, strategic integration, and contextual ambidexterity. These configurations represent an important part of an organizational capability for ambidexterity which in turn has been suggested to be an important dynamic capability of organizations allowing them to adapt and prosper in dynamic environments (O'Reilly and Tushman, 2008). Therefore, careful in-depth qualitative research that provides insights into how organizations arrive at a given level of centralization, strategic integration, and contextual ambidexterity and their specific configuration may be needed.

Finally, in this dissertation I chose a relatively simple approach to test for common method variance. While some researchers suggest that extensive testing for common methods variance should be undertaken, propose increasingly complicated approaches to do so, and suggest methods to remedy common methods biases (e.g., Podsakoff, MacKenzie, Lee and Podsakoff, 2003, Podsakoff, MacKenzie and Podsakoff, 2012), others suggest that the issue may be overstated and relatively little concern exists in most instances (Brannick, Chan, Conway, Lance and Spector, 2010, Spector, 2006). If one follows the former line of argumentation, additional testing for common method variance may be needed and measures may need to be corrected for this common methods bias with potentially weakened results. While the present data is too limited to incorporate some of these more sophisticated approaches, like latent marker variables, future studies could incorporate such variables in their research design and accordingly apply more sophisticated analysis techniques.

In addition to addressing the limitations of my study, the arguments and findings suggest some areas for further research. Specifically, the arguments put forward in this dissertation suggest an opportunity for a broader cross-fertilization between organization theoretic arguments and the procurement literature. Organization theory has developed several theoretical perspectives that would

seem to have applications also in the domain of procurement. Drawing upon these existing and well tested theories, may allow to develop stronger theory also in procurement. For instance, drawing upon a coherent theoretical body such as the ambidexterity literature has provided me with a strong theoretical foundation and thereby may have helped to put empirical findings on a stronger platform despite the limitations of the sample size that the study faces. Drawing on such established theories from organization theory may be worthwhile also for other questions related to procurement. For instance, the strong theoretical foundation provided by the ambidexterity perspective may also be insightful to provide a stronger foundation for explanations of performance differences in corporate procurement (e.g., Carter and Narasimhan, 1996, Chen, Paulraj and Lado, 2004, Sánchez-Rodríguez, 2009).

More broadly speaking, additional insight may be gained by integrating theoretical perspectives across management disciplines that often investigate closely related questions in relative separation. For instance, research in marketing, operations, procurement, strategic management, and technology management all have investigated issues around sourcing of innovation, yet the cross-fertilization of ideas and findings across these separated fields of study is often rather limited. Knowledge exchange that would cross these academic boundaries may allow to generate more integrative understanding of management challenges and thereby possibly also improve the relevance of the theories developed, given that management problems rarely fit into the narrow academic disciplines that research has created.

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Appendix 1: Semi-structured questionnaire during Exploratory research

This interview guide provides a structure for the interview process. Questions are broad and open ended and will be followed up by additional more detailed questions depending on the answer. The interview style is court-room style focusing on facts and probing into the causes for opinion. The interview guide starts with a short set of questions about the individual interviewees areas of attention.

Personal patterns of attention
What is currently the number one development issue in the procurement organization?
What do you spend most of your time with?
Who or what influences what you spend your time with?

Background of the procurement in the case firm
How did the current procurement organization get established?
How was procurement organized before the current organization was established?

Goals: Balancing exploration and exploitation
What goals does the current organization pursue?
What are short term goals? Long term goals? (e.g. innovation, new technology, learning, new business models)?
How are these goals related to the strategic goals of the company?
What is the priority of these goals? Why?
How are conflicts among these goals being resolved in actual decisions?
What activities are specifically undertaken to support long term goals?

Procurement capabilities
How have procurement capabilities developed? Personnel? Systems? Processes? Know-How?
How do these capabilities support short term goals? Long term goals?
What actions have been taken to build, improve or maintain these capabilities?
What has been the role of consultants, benchmarking from other organizations?
How have you captured lessons learned during normal processes?

Organizational architecture

Where is procurement located in the organization (dotted and solid line reporting)?

How is procurement perceived in the organization (operational, strategic, business partner, nuisance,…)?

Which stakeholders have a substantial influence on the procurement activities? Is this the same for direct and indirect? For specific categories?

Which stakeholders do you need to keep in the loop on important procurement issues?

What are the most important information channels for the procurement organization?

How open is communication?

How does the location in the organization affect procurement's ability to influence decision making?

How does the location in the organization affect procurement's internal decision making?

Procurement decision making

How centralized/decentralized is decision making?

Who decides what issues are to be considered in procurement decisions?

How well is the procurement organization able to influence long-term decisions?

In what decisions has procurement not been able to participate in?

Appendix 2: Results field study

In this appendix, I summarize some of the insights from the preliminary fieldwork. The insights from these interviews where combined with the deductive theorizing to ensure both rigor and relevance of my arguments. While not a formal test of the deductive reasoning that was the basis of the hypothesis formulation, the insights from the interviews grounded the arguments in real world data, ensured the relevance of my reasoning, and helped to refine the constructs derived from theory.

In presenting these insights, I focus on evidence related to the transformation of procurement to what is a strategic role and the implications that has for the goals of procurement, evidence regarding exploration and exploitation in procurement and evidence regarding the three constructs that are hypothesized to be antecedents of exploration and exploitation and their balance.

Procurement goals

In line with the literature review on the changing landscape of procurement, also the interviews supported a general move to a more strategic role of procurement. For instance, an interviewee from a global engineering and manufacturing company described: "this has now been the third time to launch global sourcing… I think the strategic level has increased all these years with every transformation. When [the current CEO] joined the company in 2005, in his strategy presentations, the first bullet point regarding cost consciousness was always global sourcing."

The interview suggests that the increasing strategic role of procurement in many industries derives from a change in the business environment that has created substantial pressure on profit margins and therefore has put procurement into the forefront of strategic discussions. For instance, a manager in a global steel company described: "because the demand in the world became much tighter and the trading became more transparent, what happened actually is that today the cost of raw materials is around 70% of the final price and the volatility is enormous. As a result, there is a strong link with sales because input costs such as raw material costs have a direct impact on sales prices. People do not like it, because you want to sell the product at value but there simply is a direct correlation between raw material prices and the price we can charge in the market."

Although the changing business environment was the most common reason mentioned by interviewees for the increasing strategic role of procurement, in some organizations the change in procurement's role was related with a trans-

formational event such as a new chief procurement officer or the change of reporting lines to a different executive. Such changes at least facilitated the transformation to a broader strategic role for procurement. For instance, an interviewee at a global pharmaceutical company described: "traditionally the focus was on short-term things like process efficiency. More recently with the change of procurement reporting to a different executive, we have started to look into longer-term goals and into what procurement would look like in 2020."

My fieldwork further supported that the transformation towards a strategic role of procurement triggered also a broader range of goals becoming central for procurement. Surch broadening of objectives for procurement was apparent in most interviews. For instance, an interviewee at a global pharmaceutical company described the objectives as follows: "The objectives, from a global procurement point of view, really focus on the procurement vision and that vision is to be the best procurement team in the industry or even beyond. Part of this materializes by introducing functional category management across the business and becoming a business partner, so not just reacting but being close to the business and the people that own the budgets and the spend, and to provide them advice and innovation from the external supply market, as well as challenging what to buy or even if to buy at all." Similarly, a manager from a Finnish retail firm described: "we have this five-year strategic plan. Of course quite a lot of it falls on savings but it is not all about savings. It is also about how do we transform procurement from a savings engine into a function that is actually supporting our business not only in developing the bottom line but also in developing the top line. That is far more difficult and much broader than just focusing on the bottom line."

The range of additional objectives differed substantially across interviews. However, in my fieldwork, innovation emerged as an important target for most procurement organizations. For instance, an interviewee from a global pharmaceutical company described: "we have innovation as a target which we try to project through trying to highlight innovation stories that we have come up with."

Although a broadening of objectives is apparent in many procurement organizations, even in relatively mature procurement organizations cost efficiency and savings goals continue to be a major target. For instance, an interviewee from a global pharmaceutical company described: "Because we seem to be a very profitable industry, suppliers in the past would come to pharmaceuticals and charge us more, just because we are a pharmaceutical business. So at the moment, but we are trying to change this perception that we are willing to pay more because we are a pharmaceutical business. We want to be more savings focused, so savings are a big part of our targets." Similarly, a manager in a Swiss specialty chemicals firm described: "the key thing at the corporate level over the past years has been the focus on cost. Our industry was not known to manage costs very well because we did not have to, as profitability was high. But now there is such a squeeze on margins because our customers push hard on pricing and at the same time raw materials have been going up 30-40% over a five-year period that we had to focus on cost efficiency."

Exploration and exploitation

My fieldwork confirmed that in line with the arguments in the theory section, a substantial part of the work in the procurement organizations would be classified as exploitation and occupied a fair share of the time and attention of procurement leaders.

Exploitation activities that focus on achieving short-term cost savings in core categories continue to be a major part of procurement organizations' work. For instance, a manager in a global pharmaceutical company described: "A major part of my job is in bringing savings to the business units I work with. I have specific savings targets in the categories I lead and work with the businesses to ensure that these targets are reached quarter by quarter."

A second major component of exploitation activities seems to involve rolling out processes consistently across the organization and ensuring compliance. A manager from a Swiss bank described: "if you look at my organization we have a pretty good set of tools to do strategic and tactical procurement. But only some of these tools are well utilized while others are not. Getting them utilized more broadly is something we are working on very hard." Similarly, a manager from a global steel company suggested: "Rolling out processes and tools and ensuring compliance continues to be a major part of our work. Overall I have achieved pretty good compliance on most levels of the organization but at the executive level. But this is one topic that continues to require further work."

Third, supplier relationship development seems to be a major element of exploitation activity. For instance, a manager from a Swiss specialty chemicals firm described: "We have a large number of suppliers. Getting them to work along the same lines in terms of delivery and quality has been a tremendous effort. Ensuring that suppliers deliver what they promise and continue to improve once they have won our business."

Finally, exploitation can also take the path of refinement of existing tools and processes. For instance, a procurement manager from a Nordic bank described: "I think our organization has a long enough history behind with focus on procurement. So the basic things are in place. All these kind of processes and spend analysis tools and e-procurement tools, etc. are in place. I guess that the current discussions we are having are related mostly to improvements and refinements."

Although exploitation may continue to be the majority of the procurement activities, also exploration activities were frequently mentioned during the interviews. My fieldwork suggests that exploration activities often center around innovation. For instance, an interviewee from a global pharmaceutical company said: "Innovation is a big word; one of the things where I think procurement possesses the opportunity to bring new ideas and ways of doing business is by bringing their knowledge how to deal with suppliers to our business partners. They are not always dealing with suppliers, so we have to bring knowledge about this." An interviewee from a Swiss bank pointed to procurements opportunities to identify innovations: "There is all the Fintech start-ups we are talking to. Bringing their new ideas to the rest of the organization can really add value to

the business. However, without a professional procurement organization, the risk of confusing relationships with real value is there."

Supporting my conceptualization in the theory section, my fieldwork suggests that exploration can also relate to finding new suppliers. For instance, an interviewee from a global engineering and manufacturing firm described: "finding new suppliers has been one of the biggest challenges over the past years. We have focused on finding new suppliers that had never been doing anything with our industry, in the emerging markets where we have some of our component production and then in China. Initially it was about identifying them and developing them so that no issues occur."

Exploration may also involve encouraging supplier innovation but procurement managers at times find it difficult to concretize such work as some of my interviews suggest. For instance, an interviewee from a global engineering and manufacturing firm described: "We had supplier innovation as a key theme of our supply a day four years ago. It is a nice topic of discussion but how to concretize it? You cannot really measure if you have been innovative or not; if you have captured supplier innovations or not. But that is the key to really manage it."

In some companies, exploration also relates to organizational innovation involving different approaches to set up and develop procurement but also the way the corporation interfaces with suppliers. In this respect, an interviewee from a global engineering and manufacturing firm described: "We have this development team which traditionally does processes and tools, but now the direction is that we will have 20, 30 people sitting at supplier premises and doing preventive developments, implementing processes like has been done in the automotive industry, and ensuring that what the suppliers deliver meets our requirements. We believe these investments will in the future pay back many times." Similarly, a manager in a global pharmaceutical company described how his company was planning to change their approach to spend analytics: "at the moment spend analytics just takes a lot of work. We probably spend about 25% of our time looking for data and then running out of time and then only have 5% of our time to really analyze it and drive decisions from it. So we plan to change that balance but it requires a major shift in many businesses, a shift that will be driven by big data. We are exploring the use big data analytic techniques to drive insights out of the data we have in our organization. It is going to happen and it is going to be a revolution but it will take a few years. That is something I am working right on and it will be a long term process."

Finally, exploration activities are often linked to planned transformation, being a precursor of large scale changes in procurement processes and practices. For instance, a manager from a global pharmaceutical company described: "We're investigating how to transform that area. In facility management one of the things we look at there is what we call 'integrated facility management', which means to really outsource it or to bring in a company which can manage the facilities. We have somebody from that company sitting on our management teams, but that's pretty early stages yet and we've not really got very far with that. A lot of it is managed in-house at the moment."

My fieldwork also provides some pointers on how procurement organizations organize themselves for exploration. Exploration activity may at times be organized similar to research and development. For instance, an interviewee at a global pharmaceutical company described their process of exploring outsourcing in a specific category as follows: "We are investigating it. We call it discovery stage, where we exchange ideas with different groups around the company, and talk to suppliers and show what the capabilities are. That is something which is ongoing and it is very early stages." Such explorations may ultimately turn into different sourcing approaches but equally often may as well be abandoned when business cases do not provide a rationale to implement the ideas generated.

Interestingly, in some instances, exploration may take a temporary, project type form. For instance, a manager in a Swiss specialty chemicals company described: "what we did is that we created a special project which has a steering committee consisting of the CFO, the head of HR, myself, and the CEO and we gave it a name, project name, with a very specific target of saving 10% of the indirect spend in the long run."

Balancing exploration and exploitation

In my fieldwork I found evidence for all three constructs hypothesized in the theory section to relate to exploration, exploitation, and their balance.

Regarding contextual ambidexterity my fieldwork provided particular evidence regarding performance management. Interview suggested that balancing short-term and long-term objectives may require a different approach to performance management. For instance, an interviewee at a global pharmaceutical company described: "we have changed our approach to performance management; individual performance management was changed from what has been done to watch how it has been done. The how is about behaviors and competencies and in terms of being part of the longer-term goals of the business, of being ingrained in what drives the business, to become business partners." Similarly, a manager from a Swiss specialty chemicals firm described: "to focus on innovation alongside our typical performance metrics really has to happen on the individual level. It requires that people understand that to be successful in the long run they have to stretch beyond the low hanging fruit they can reach here and now."

My fieldwork further suggested that contextual ambidexterity creates a more challenging task environment for procurement personnel and as a result a climate of trust and support may be needed in addition to performance management. For instance an interviewee at a global pharmaceutical company described: "pursuing long-term goals alongside our savings goals has stretched individuals quite a bit. We had to support procurement managers to enable them to set the right focus." An interviewee at a global engineering firm suggested: "if you want people to pursue innovation and not only savings you have to trust their ability to spot good ideas. Innovation you cannot as easily control."

My interviews also provided evidence that balancing long-term and short-term objectives require strategic integration. For instance, an interviewee at a

global pharmaceutical company described: “when we have category strategies, they have been developed with the business and the business has been part of the decision-making on that category management project. In fact, we sometimes even get the business to run the strategy project and not just to be part of it so that they buy into the strategy and ultimately apply the solutions that come out of it or the strategies that come out. Procurement can be a strong decision-maker if it is involved with the business very early, developing a strategy, but it can be very reactional if there is no strategy in place and we are just sourcing one-off items.” Similarly, an interviewee at the subsidiary of a pharmaceutical company described: “To become strategic we needed to really integrate with the business. For that we established this role of the procurement business partner. The procurement business partner is a procurement manager that sits with the business and directly answers to business needs. Sitting with the business, we have access to the information, the possibility to attend to all meetings, and are involved much earlier.”

In organizations where strategies are integrated, procurement goals are derived from corporate strategy. For instance, one interviewee from a global engineering and manufacturing firm described: “we have this hierarchy where at the top we have our company strategy and we have our KPIs on the bottom. So we tried to create this link to the corporate strategy.” Similarly, a manager from a Swiss specialty chemicals firm described:” I have a set of KPIs and they cover things like savings, lead time reduction, payment terms, training, strategies, innovation, and a few different things and we look at those quarterly. Those KPIs are aligned to the corporate goals that the CEO and I set every year.”

Strategic integration is also reflected by an early involvement of procurement in the strategic target setting process. For instance, a manager in a global pharmaceutical firm described: “the way it works in our organization is that the business has targets that it is given, targets in terms of its spend and what it needs to perform with that spent in the following years. Then procurement comes to the table and we work with the business in reviewing these targets and budgets and built plans around how we are going to help the business to achieve their cost targets. We sit with the business and we figure out where procurement is going to drive the value to enable the business to meet its targets.” Similarly, a manager from a Finnish bank suggested: “to be really strategic it is actually important to be involved early enough in the business discussions when the business units are making their long-term business plans and to then link the procurement planning with these business plans.”

Strategic integration also seems to mean that procurement is tightly integrated at senior leadership levels. For instance, a manager in a global pharmaceutical firm described: “at the leadership level we are integrated with the key business leads. So I sit with the head of HR, the head of legal, and all the other senior managers in my space. We work on the overall direction of their function. Only when we go into specific sourcing activities, there is a sourcing process that is kicked off and also then we build cross functional teams that may encompass many individuals in the organization.”

Supporting prior research (Knoppen and Saenz, 2015) my field work suggests that even in mature procurement organizations, strategic integration continues to be challenging for procurement. For instance, an interviewee at a global pharmaceutical company described the absent link between corporate objectives and procurement of objectives: “I would say that there are corporate objectives, but our procurement objectives are not linked to them at the moment. We have a balanced scorecard for procurement, but it is not necessarily a cascade from our corporate objectives. There are some similarities and some factors that are similar, but in general it is set up for procurement only.”

Some interviewees pointed to the importance of cross functional integration to balance long-term and short-term goals. For instance an interviewee from a global engineering and manufacturing firm described: ”For me it is a bit difficult to see a difference between long-term and short-term goals. It is much more about integrating the different functions and having them agree on common targets. This helps because I think typically other functions are looking at bit longer term than sourcing. If you ask any other function, they often feel that sourcing has the shortest term horizon, because they just want to get the prices down.”

Centralization supports both exploitation and exploration. For instance, a manager in a Finnish retail company suggested: “traditionally our procurement has been completely decentralized. But then some islands of centralization emerged. To name one that would be IT. This really led to the development of capabilities in procurement in terms of practices and processes but it also showed the potential and kicked off a transformation that will bring forward the development of the whole procurement in the long run.”

One advantage of centralization may be the control it gives you over procurement resources. For instance, a manager from a global steel company suggested: “We started with the network organization and as a function of leader I had a dotted line to most of my procurement people. In many of the units this meant you lose control. Once I became the group director the whole world changed and I was much better able to push decisions through.”

At the same time, my fieldwork suggests that centralization may create some challenges regarding the interplay between the corporate center and the business units. For instance, a manager from a global pharmaceutical firm described: “Very often this challenge is coming from the center to the regions and countries in terms of how they are managing their spend, their suppliers, their stakeholders. Conversely there is frequently a push from the regions back to the centers of excellence, the categories, in terms of how they are developing the holistic category strategies and how they are including basic local requirement. There is attention that requires dialogue. But I think, in any organization, you are always going to find that there is a center versus the rest of the world kind of mentality. In large global organizations despite the fact that everybody, effectively, wants to do the right thing for the organization they work in.”

Summary of the fieldwork results

The results of my fieldwork support the increasing importance of procurement and the need to balance exploration and exploitation. My fieldwork suggests that this increasing importance is often driven by environmental or organizational change and leads to a broad range of strategic objectives being pursued by procurement. Despite the increased number of objectives, however, cost efficiency and savings continue to be major objectives of procurement. This importance of cost efficiency and savings is also reflected in the finding that exploitation continues to be a major part of procurement activities. Exploitation activities in my fieldwork include savings oriented activity, process rollout, supplier development, and the refinement of supplier relationships and processes. My fevered also provided evidence for a broad range of exploration activities that involve product and service innovations, new suppliers, the encouragement of supplier innovation, and organizational innovation. These exploration activities are often supported by R&D like approaches or through specific projects.

My fieldwork suggests that exploration exploitation are being balanced through contextual ambidexterity, through strategic integration and through centralization. Contextual ambidexterity involved in particular efforts in emphasizing performance management. Strategic integration took place through cascading of corporate strategies, early involvement of procurement, senior leader integration, and cross functional teams. However, my fevered also suggests that strategic integration continues to be challenging for procurement. Centralization was found to operate through increased power of procurement and access to resources but also here challenges continue.

Appendix 3: Results Confirmatory Factor Analysis

	Standardized	Coef.	OIM Std. Err.	z	P>z	[95% Conf.	Interval]
Measurement							
KPI__Perf_Savings <-							
	KPI_Performance2	0.7137521	0.0928981	7.68	0.000	0.531675	0.8958291
	_cons	4.17549	0.2893565	14.43	0.000	3.608362	4.742618
KPI_Perf_PampL_Impact <-							
	KPI_Performance2	0.8946968	0.1046383	8.55	0.000	0.6896095	1.099784
	_cons	4.043875	0.2957801	13.67	0.000	3.464156	4.623593
centralization1 <-							
	Centralization	0.5892495	0.0655466	8.99	0.000	0.4607805	0.7177184
	_cons	2.747714	0.201161	13.66	0.000	2.353446	3.141982
centralization2 <-							
	Centralization	0.8639931	0.0295659	29.22	0.000	0.806045	0.9219413
	_cons	2.778618	0.2029518	13.69	0.000	2.380839	3.176396
centralization3 <-							
	Centralization	0.936002	0.0218057	42.92	0.000	0.8932637	0.9787403
	_cons	3.299469	0.2336745	14.12	0.000	2.841476	3.757463
centralization4 <-							
	Centralization	0.8508379	0.0303398	28.04	0.000	0.7913729	0.9103029
	_cons	3.157429	0.2252056	14.02	0.000	2.716034	3.598824
KPI_Perf_Innovation <-							
	KPI_Performance	0.7751354	0.0845838	9.16	0.000	0.6093542	0.9409166
	_cons	4.175651	0.3214366	12.99	0.000	3.545647	4.805656
KPI_Perf_Time_to_market <-							
	KPI_Performance	0.7360674	0.0872916	8.43	0.000	0.564979	0.9071558
	_cons	3.892462	0.3095564	12.57	0.000	3.285742	4.499181
Strategic_integration1 <-							
	Strategic_Integration	0.8367198	0.0393866	21.24	0.000	0.7595235	0.9139162
	_cons	3.041601	0.2183464	13.93	0.000	2.61365	3.469552
Strategic_integration2 <-							
	Strategic_Integration	0.7823043	0.0461182	16.96	0.000	0.6919143	0.8726943
	_cons	4.18395	0.2874893	14.55	0.000	3.620481	4.747418
Strategic_integration7 <-							
	Strategic_Integration	0.7613675	0.0481037	15.83	0.000	0.667086	0.855649
	_cons	2.792879	0.2046458	13.65	0.000	2.391781	3.193978
Strategic_integration8 <-							
	Strategic_Integration	0.7858441	0.0458749	17.13	0.000	0.6959311	0.8757572
	_cons	2.926758	0.21273	13.76	0.000	2.509815	3.343701
Contextual_ambidexterity1 <-							
	Perform	0.674188	0.0588111	11.46	0.000	0.5589203	0.7894556
	_cons	4.584493	0.3140488	14.6	0.000	3.968969	5.200018
Contextual_ambidexterity4 <-							
	Perform	0.6583364	0.0604321	10.89	0.000	0.5398917	0.7767812
	_cons	4.289361	0.29873	14.36	0.000	3.703861	4.874861
Contextual_ambidexterity6 <-							
	Perform	0.7085192	0.0551311	12.85	0.000	0.6004642	0.8165743
	_cons	3.849692	0.2684013	14.34	0.000	3.323635	4.375749
Contextual_ambidexterity7 <-							
	Perform	0.7942671	0.0443291	17.92	0.000	0.7073837	0.8811505
	_cons	3.637258	0.2564935	14.18	0.000	3.13454	4.139976
Contextual_ambidexterity8 <-							
	Perform	0.7888859	0.0454657	17.35	0.000	0.6997748	0.877997
	_cons	3.69204	0.261433	14.12	0.000	3.17964	4.204439

Contextual_ambidexterity11 <-						
Support	0.6887328	0.064156	10.74	0.000	0.5629893	0.8144764
_cons	3.578762	0.2520017	14.2	0.000	3.084848	4.072677
Contextual_ambidexterity13 <-						
Support	0.794013	0.0591215	13.43	0.000	0.6781371	0.909889
_cons	3.535123	0.2496688	14.16	0.000	3.045781	4.024464
Contextual_ambidexterity14 <-						
Trust	0.8325568	0.0519361	16.03	0.000	0.730764	0.9343496
_cons	4.669789	0.3238852	14.42	0.000	4.034985	5.304592
Contextual_ambidexterity15 <-						
Trust	0.7370708	0.0568099	12.97	0.000	0.6257254	0.8484161
_cons	3.955285	0.2754257	14.36	0.000	3.41546	4.495109
EampE_balance1 <-						
Exploration	0.7782688	0.0461156	16.88	0.000	0.687884	0.8686537
_cons	3.347019	0.2377483	14.08	0.000	2.881041	3.812998
EampE_balance2 <-						
Exploration	0.8524808	0.0386596	22.05	0.000	0.7767093	0.9282523
_cons	3.32383	0.236667	14.04	0.000	2.859972	3.787689
EampE_balance3 <-						
Exploration	0.8204691	0.0417566	19.65	0.000	0.7386276	0.9023106
_cons	3.742173	0.2623329	14.26	0.000	3.22801	4.256336
EampE_balance9 <-						
Exploitation	0.7385976	0.0563046	13.12	0.000	0.6282426	0.8489525
_cons	2.811641	0.2054089	13.69	0.000	2.409047	3.214235
EampE_balance10 <-						
Exploitation	0.855996	0.0479164	17.86	0.000	0.7620816	0.9499103
_cons	4.050198	0.2798973	14.47	0.000	3.501609	4.598786
EampE_balance12 <-						
Exploitation	0.6647841	0.0623537	10.66	0.000	0.5425731	0.786995
_cons	4.409054	0.3045339	14.48	0.000	3.812178	5.005929
KPI_Perf_Quality <-						
KPI_Performance3	0.7751669	0.0745709	10.4	0.000	0.6290106	0.9213232
_cons	4.337305	0.3026184	14.33	0.000	3.744184	4.930426
KPI_Perf_Del_rel <-						
KPI_Performance3	0.831486	0.0748352	11.11	0.000	0.6848117	0.9781603
_cons	3.89203	0.2729697	14.26	0.000	3.357019	4.427041
var(e.KPI__Perf_Savings)	0.490558	0.1326125			0.288792	0.8332889
var(e.KPI_Perf_PampL_Impact)	0.1995175	0.1872392			0.0317075	1.25545
var(e.centralization1)	0.6527851	0.0772466			0.5176596	0.8231826
var(e.centralization2)	0.2535158	0.0510895			0.1707921	0.3763072
var(e.centralization3)	0.1239002	0.0408203			0.0649582	0.236325
var(e.centralization4)	0.2760749	0.0516286			0.191357	0.3982993
var(e.KPI_Perf_Innovation)	0.3991651	0.1311278			0.2096662	0.7599354
var(e.KPI_Perf_Time_to_market)	0.4582048	0.128505			0.2644463	0.7939292
var(e.Strategic_integration1)	0.2999	0.0659111			0.1949404	0.4613717
var(e.Strategic_integration2)	0.388	0.0721569			0.2694837	0.5586386
var(e.Strategic_integration7)	0.4203195	0.0732492			0.2987036	0.5914509
var(e.Strategic_integration8)	0.382449	0.072101			0.2643025	0.5534085
var(e.Contextual_ambidexterity1)	0.5454706	0.0792995			0.410228	0.7252995
var(e.Contextual_ambidexterity4)	0.5665931	0.0795693			0.4302621	0.7461214
var(e.Contextual_ambidexterity6)	0.4980005	0.0781229			0.3661838	0.6772679
var(e.Contextual_ambidexterity7)	0.3691398	0.0704183			0.2539879	0.5364988
var(e.Contextual_ambidexterity8)	0.3776591	0.0717345			0.2602666	0.5480011
var(e.Contextual_ambidexterity11)	0.5256471	0.0883727			0.3780844	0.7308021
var(e.Contextual_ambidexterity13)	0.3695433	0.0938864			0.2245994	0.6080261
var(e.Contextual_ambidexterity14)	0.3068492	0.0864794			0.1766162	0.5331132
var(e.Contextual_ambidexterity15)	0.4567267	0.0837458			0.3188448	0.6542345
var(e.EampE_balance1)	0.3942976	0.0717806			0.2759724	0.5633557
var(e.EampE_balance2)	0.2732764	0.0659132			0.1703318	0.4384384
var(e.EampE_balance3)	0.3268304	0.06852			0.2167045	0.4929206
var(e.EampE_balance9)	0.4544736	0.0831728			0.3174907	0.6505585
var(e.EampE_balance10)	0.2672709	0.0820324			0.1464521	0.4877617
var(e.EampE_balance12)	0.5580622	0.0829035			0.4170917	0.7466785
var(e.KPI_Perf_Quality)	0.3991163	0.1156098			0.2262229	0.7041454
var(e.KPI_Perf_Del_rel)	0.308631	0.1244489			0.1400266	0.6802498
var(KPI_Performance2)	1	.			.	.
var(Centralization)	1	.			.	.
var(KPI_Performance)	1	.			.	.
var(Strategic_Integration)	1	.			.	.
var(Perform)	1	.			.	.
var(Support)	1	.			.	.
var(Trust)	1	.			.	.
var(Exploration)	1	.			.	.
var(Exploitation)	1	.			.	.
var(KPI_Performance3)	1	.			.	.

cov(KPI_Performance2,Centralization)	0.2494449	0.10558	2.36	0.018	0.0425118	0.4563779
cov(KPI_Performance2,KPI_Performance)	0.3522999	0.1178903	2.99	0.003	0.1212393	0.5833606
cov(KPI_Performance2,Strategic_Integration)	0.2780299	0.1062653	2.62	0.009	0.0697538	0.486306
cov(KPI_Performance2,Perform)	0.1922595	0.1116519	1.72	0.085	-0.0265742	0.4110933
cov(KPI_Performance2,Support)	0.3226404	0.1224782	2.63	0.008	0.0825875	0.5626934
cov(KPI_Performance2,Trust)	0.3873697	0.1101406	3.52	0.000	0.171498	0.6032414
cov(KPI_Performance2,Exploration)	0.3144275	0.1052632	2.99	0.003	0.1081155	0.5207396
cov(KPI_Performance2,Exploitation)	0.1099867	0.1211405	0.91	0.364	-0.1274443	0.3474177
cov(KPI_Performance2,KPI_Performance3)	0.3495523	0.1118381	3.13	0.002	0.1303537	0.5687509
cov(Centralization,KPI_Performance)	0.1968417	0.1159412	1.7	0.090	-0.0303989	0.4240823
cov(Centralization,Strategic_Integration)	0.3449487	0.091791	3.76	0.000	0.1650416	0.5248558
cov(Centralization,Perform)	0.2868726	0.097783	2.93	0.003	0.0952214	0.4785237
cov(Centralization,Support)	0.3523257	0.1022459	3.45	0.001	0.1519275	0.5527239
cov(Centralization,Trust)	0.4067159	0.0943541	4.31	0.000	0.2217854	0.5916465
cov(Centralization,Exploration)	0.38809	0.0904295	4.29	0.000	0.2108515	0.5653285
cov(Centralization,Exploitation)	0.2960493	0.09832	3.01	0.003	0.1033456	0.488753
cov(Centralization,KPI_Performance3)	0.2837526	0.1013328	2.8	0.005	0.0851438	0.4823613
cov(KPI_Performance,Strategic_Integration)	0.1745125	0.1325667	1.32	0.188	-0.0853134	0.4343384
cov(KPI_Performance,Perform)	0.1844005	0.1247724	1.48	0.139	-0.0601489	0.4289499
cov(KPI_Performance,Support)	0.2504532	0.1313599	1.91	0.057	-0.0070076	0.5079139
cov(KPI_Performance,Trust)	0.4976627	0.1157556	4.3	0.000	0.2707858	0.7245395
cov(KPI_Performance,Exploration)	0.5036025	0.103434	4.87	0.000	0.3008756	0.7063293
cov(KPI_Performance,Exploitation)	0.1945762	0.1280629	1.52	0.129	-0.0564226	0.445575
cov(KPI_Performance,KPI_Performance3)	0.5691474	0.1029932	5.53	0.000	0.3672844	0.7710103
cov(Strategic_Integration,Perform)	0.6408691	0.0718795	8.92	0.000	0.4999879	0.7817502
cov(Strategic_Integration,Support)	0.6705778	0.0812386	8.25	0.000	0.5113531	0.8298025
cov(Strategic_Integration,Trust)	0.6088709	0.0839941	7.25	0.000	0.4442456	0.7734963
cov(Strategic_Integration,Exploration)	0.4782123	0.0875142	5.46	0.000	0.3066876	0.649737
cov(Strategic_Integration,Exploitation)	0.5900142	0.0795132	7.42	0.000	0.4341712	0.7458573
cov(Strategic_Integration,KPI_Performance3)	0.27078	0.1052152	2.57	0.010	0.064562	0.476998
cov(Perform,Support)	0.7359648	0.0748858	9.83	0.000	0.5891913	0.8827384
cov(Perform,Trust)	0.6716797	0.0764674	8.78	0.000	0.5218064	0.8215529
cov(Perform,Exploration)	0.5919774	0.0783288	7.56	0.000	0.4384558	0.7454989
cov(Perform,Exploitation)	0.5719512	0.0823877	6.94	0.000	0.4104742	0.7334282
cov(Perform,KPI_Performance3)	0.2361515	0.1091812	2.16	0.031	0.0221603	0.4501427
cov(Support,Trust)	0.7709748	0.0777904	9.91	0.000	0.6185085	0.9234411
cov(Support,Exploration)	0.4760129	0.1023837	4.65	0.000	0.2753446	0.6766812
cov(Support,Exploitation)	0.6256731	0.0898019	6.97	0.000	0.4496646	0.8016816
cov(Support,KPI_Performance3)	0.4251568	0.1136609	3.74	0.000	0.2023855	0.6479281
cov(Trust,Exploration)	0.5618763	0.0867682	6.48	0.000	0.3918137	0.7319389
cov(Trust,Exploitation)	0.4212876	0.1010724	4.17	0.000	0.2231893	0.619386
cov(Trust,KPI_Performance3)	0.4778872	0.100863	4.74	0.000	0.2801994	0.675575
cov(Exploration,Exploitation)	0.401237	0.0964232	4.16	0.000	0.2122511	0.5902229
cov(Exploration,KPI_Performance3)	0.254417	0.1075297	2.37	0.018	0.0436626	0.4651714
cov(Exploitation,KPI_Performance3)	0.1964147	0.11602	1.69	0.090	-0.0309803	0.4238097

LR test of model vs. saturated: chi2(332) = 417.53, Prob > chi2 = 0.0010

Fit statistic	Value	Description
Likelihood ratio		
chi2_ms(332)	417.534	model vs. saturated
p > chi2	0.001	
chi2_bs(406)	2035.785	baseline vs. saturated
p > chi2	0.000	
Population error		
RMSEA	0.047	Root mean squared error of approximation
90% CI, low er bound	0.031	
upper bound	0.060	
pclose	0.641	Probability RMSEA <= 0.05
Information criteria		
AIC	9896.358	Akaike's information criterion
BIC	10262.088	Bayesian information criterion
Baseline comparison		
CFI	0.948	Comparative fit index
TLI	0.936	Tucker-Lew is index
Size of residuals		
CD	1.000	Coefficient of determination

Note: SRMR is not reported because of missing values.

Appendix 4: Results group analysis

Results Corporate Strategy

```
. ttest centralization , by(Technology_leader)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	75	5.053333	.1639389	1.419753	4.726678	5.379989
1	43	4.889535	.2292469	1.503273	4.426896	5.352174
combined	118	4.993644	.1331615	1.446504	4.729925	5.257363
diff		.1637984	.2774651		-.3857561	.713353

```
    diff = mean(0) - mean(1)                                      t =   0.5903
Ho: diff = 0                     degrees of freedom =      116

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.7219         Pr(|T| > |t|) = 0.5561          Pr(T > t) = 0.2781

. ttest strategic_integration , by(Technology_leader)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	72	4.645833	.1547808	1.313359	4.337209	4.954458
1	43	4.813953	.1824781	1.196589	4.445698	5.182209
combined	115	4.708696	.1182656	1.268257	4.474412	4.942979
diff		-.1681202	.245		-.6535093	.3172689

```
    diff = mean(0) - mean(1)                                      t =  -0.6862
Ho: diff = 0                     degrees of freedom =      113

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.2470         Pr(|T| > |t|) = 0.4940          Pr(T > t) = 0.7530

. ttest performance_management , by(Technology_leader)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	70	5.031429	.1363612	1.14088	4.759395	5.303462
1	37	5.383784	.1371916	.8345037	5.105546	5.662021
combined	107	5.153271	.1019499	1.054578	4.951145	5.355397
diff		-.3523552	.2126041		-.7739099	.0691995

```
    diff = mean(0) - mean(1)                                      t =  -1.6573
Ho: diff = 0                     degrees of freedom =      105

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0502         Pr(|T| > |t|) = 0.1004          Pr(T > t) = 0.9498
```

```
. ttest support , by(Technology_leader)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      72    5.284722    .1512294    1.283224    4.983179    5.586265
       1 |      42    5.238095    .2150265    1.393531     4.80384     5.67235
---------+--------------------------------------------------------------------
combined |     114    5.267544    .1235347     1.31899    5.022799    5.512288
---------+--------------------------------------------------------------------
    diff |            .046627    .2571991               -.46298     .556234
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =   0.1813
Ho: diff = 0                     degrees of freedom =      112

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.5718         Pr(|T| > |t|) = 0.8565          Pr(T > t) = 0.4282

. ttest trust , by(Technology_leader)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      71    4.950704    .1364817    1.150015      4.6785    5.222908
       1 |      42         5.5    .1308864    .8482406     5.23567     5.76433
---------+--------------------------------------------------------------------
combined |     113    5.154867    .1013654     1.07753    4.954025     5.35571
---------+--------------------------------------------------------------------
    diff |           -.5492958    .2041464               -.9538254   -.1447661
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -2.6907
Ho: diff = 0                     degrees of freedom =      111

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0041         Pr(|T| > |t|) = 0.0082          Pr(T > t) = 0.9959

. ttest exploration_new , by(Technology_leader)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      73    4.378995    .1385941    1.184148    4.102713    4.655278
       1 |      43    4.810078    .1664433    1.091442    4.474181    5.145974
---------+--------------------------------------------------------------------
combined |     116    4.538793    .1081464    1.164772    4.324576     4.75301
---------+--------------------------------------------------------------------
    diff |           -.4310821    .2212365               -.8693499    .0071856
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -1.9485
Ho: diff = 0                     degrees of freedom =      114

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0269         Pr(|T| > |t|) = 0.0538          Pr(T > t) = 0.9731

. ttest exploitation_new , by(Technology_leader)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      74    4.851351    .1306817    1.124166    4.590903     5.1118
       1 |      43    4.860465    .1733551    1.136765     4.51062    5.21031
---------+--------------------------------------------------------------------
combined |     117    4.854701    .1039061    1.123917    4.648902     5.0605
---------+--------------------------------------------------------------------
    diff |           -.0091138    .2164481               -.4378557    .4196282
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -0.0421
Ho: diff = 0                     degrees of freedom =      115

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.4832         Pr(|T| > |t|) = 0.9665          Pr(T > t) = 0.5168
```

```
. ttest Balance_content_multiplicative , by(Technology_leader)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      74     21.6677    1.151957    9.909509    19.37185    23.96355
       1 |      43    24.42587    1.502412    9.851976    21.39388    27.45786
---------+--------------------------------------------------------------------
combined |     117    22.68139    .9185821    9.935985    20.86202    24.50075
---------+--------------------------------------------------------------------
    diff |           -2.758173    1.896159               -6.5141    .9977537
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -1.4546
Ho: diff = 0                                     degrees of freedom =      115

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0743         Pr(|T| > |t|) = 0.1485          Pr(T > t) = 0.9257

. ttest KPI_Performance_Fin , by(Technology_leader)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      65    4.838462    .1404439    1.132295    4.557893     5.11903
       1 |      38    4.947368    .1619905    .9985765    4.619144    5.275592
---------+--------------------------------------------------------------------
combined |     103    4.878641    .1065319     1.08118    4.667335    5.089946
---------+--------------------------------------------------------------------
    diff |           -.1089069    .2216099               -.5485212    .3307075
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -0.4914
Ho: diff = 0                                     degrees of freedom =      101

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.3121         Pr(|T| > |t|) = 0.6242          Pr(T > t) = 0.6879

. ttest KPI_Performance_Inno , by(Technology_leader)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      57    3.763158    .1062765    .8023696    3.550261    3.976055
       1 |      34         4.5     .131832    .7687061    4.231786    4.768214
---------+--------------------------------------------------------------------
combined |      91    4.038462    .0905251    .8635546    3.858618    4.218305
---------+--------------------------------------------------------------------
    diff |           -.7368421     .171199               -1.077011   -.3966734
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -4.3040
Ho: diff = 0                                     degrees of freedom =       89

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0000         Pr(|T| > |t|) = 0.0000          Pr(T > t) = 1.0000

. ttest KPI_Performance_Ops, by(Technology_leader)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      70         4.5    .1182166    .9890707    4.264164    4.735836
       1 |      42    4.571429    .1639483    1.062506    4.240328    4.902529
---------+--------------------------------------------------------------------
combined |     112    4.526786    .0957258    1.013066    4.337099    4.716473
---------+--------------------------------------------------------------------
    diff |           -.0714286    .1985102               -.4648292    .3219721
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -0.3598
Ho: diff = 0                                     degrees of freedom =      110

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.3598         Pr(|T| > |t|) = 0.7197          Pr(T > t) = 0.6402
```

Results procurement goals

```
. ttest centralization , by(Innovation_focus2)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	64	4.863281	.1817001	1.453601	4.500183	5.22638
1	54	5.148148	.1954361	1.436156	4.756153	5.540143
combined	118	4.993644	.1331615	1.446504	4.729925	5.257363
diff		-.2848669	.2671279		-.8139474	.2442136

```
    diff = mean(0) - mean(1)                                      t =  -1.0664
Ho: diff = 0                     degrees of freedom =      116

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.1442         Pr(|T| > |t|) = 0.2885          Pr(T > t) = 0.8558

. ttest strategic_integration , by(Innovation_focus2)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	62	4.354839	.1623577	1.278405	4.030185	4.679493
1	53	5.122642	.1557181	1.133645	4.81017	5.435113
combined	115	4.708696	.1182656	1.268257	4.474412	4.942979
diff		-.7678028	.2270967		-1.217722	-.3178832

```
    diff = mean(0) - mean(1)                                      t =  -3.3810
Ho: diff = 0                     degrees of freedom =      113

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0005         Pr(|T| > |t|) = 0.0010          Pr(T > t) = 0.9995

. ttest performance_management , by(Innovation_focus2)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	56	4.839286	.1624024	1.215308	4.513824	5.164747
1	51	5.498039	.0991529	.7080933	5.298885	5.697194
combined	107	5.153271	.1019499	1.054578	4.951145	5.355397
diff		-.6587535	.1947564		-1.044919	-.2725876

```
    diff = mean(0) - mean(1)                                      t =  -3.3824
Ho: diff = 0                     degrees of freedom =      105

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0005         Pr(|T| > |t|) = 0.0010          Pr(T > t) = 0.9995
```

```
. ttest support , by(Innovation_focus2)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	61	5.016393	.1760865	1.375279	4.664168	5.368619
1	53	5.556604	.1647778	1.199601	5.225953	5.887255
combined	114	5.267544	.1235347	1.31899	5.022799	5.512288
diff		-.5402103	.2434903		-1.022655	-.0577656

```
    diff = mean(0) - mean(1)                                      t =  -2.2186
Ho: diff = 0                     degrees of freedom =      112

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0143         Pr(|T| > |t|) = 0.0285          Pr(T > t) = 0.9857

. ttest trust , by(Innovation_focus2)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	61	4.959016	.156941	1.225748	4.645088	5.272945
1	52	5.384615	.1145647	.8261379	5.154617	5.614614
combined	113	5.154867	.1013654	1.07753	4.954025	5.35571
diff		-.425599	.2002573		-.8224222	-.0287758

```
    diff = mean(0) - mean(1)                                      t =  -2.1253
Ho: diff = 0                     degrees of freedom =      111

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0179         Pr(|T| > |t|) = 0.0358          Pr(T > t) = 0.9821

. ttest exploration_new , by(Innovation_focus2)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	62	4.193548	.1489427	1.172776	3.895719	4.491378
1	54	4.935185	.1401873	1.030162	4.654005	5.216365
combined	116	4.538793	.1081464	1.164772	4.324576	4.75301
diff		-.7416368	.2063824		-1.150479	-.3327948

```
    diff = mean(0) - mean(1)                                      t =  -3.5935
Ho: diff = 0                     degrees of freedom =      114

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0002         Pr(|T| > |t|) = 0.0005          Pr(T > t) = 0.9998

. ttest exploitation_new , by(Innovation_focus2)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	63	4.761905	.1507465	1.196513	4.460567	5.063243
1	54	4.962963	.1406193	1.033337	4.680916	5.24501
combined	117	4.854701	.1039061	1.123917	4.648902	5.0605
diff		-.2010582	.2084928		-.6140424	.2119259

```
    diff = mean(0) - mean(1)                                      t =  -0.9643
Ho: diff = 0                     degrees of freedom =      115

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.1684         Pr(|T| > |t|) = 0.3369          Pr(T > t) = 0.8316
```

```
. ttest Balance_content_multiplicative , by(Innovation_focus2)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	63	20.23369	1.242479	9.86187	17.75001	22.71737
1	54	25.53704	1.268367	9.320554	22.99302	28.08106
combined	117	22.68139	.9185821	9.935985	20.86202	24.50075
diff		-5.303351	1.783316		-8.835757	-1.770945

```
    diff = mean(0) - mean(1)                                      t =  -2.9739
Ho: diff = 0                     degrees of freedom =      115

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0018         Pr(|T| > |t|) = 0.0036          Pr(T > t) = 0.9982

. ttest KPI_Performance_Fin , by(Innovation_focus2)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	53	4.801887	.1525899	1.110871	4.495693	5.108081
1	50	4.96	.1490377	1.053856	4.660497	5.259503
combined	103	4.878641	.1065319	1.08118	4.667335	5.089946
diff		-.1581132	.2136282		-.5818942	.2656678

```
    diff = mean(0) - mean(1)                                      t =  -0.7401
Ho: diff = 0                     degrees of freedom =      101

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.2305         Pr(|T| > |t|) = 0.4609          Pr(T > t) = 0.7695

. ttest KPI_Performance_Inno , by(Innovation_focus2)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	45	3.888889	.1209066	.8110661	3.645218	4.13256
1	46	4.184783	.1322042	.8966524	3.91851	4.451056
combined	91	4.038462	.0905251	.8635546	3.858618	4.218305
diff		-.2958937	.1793537		-.6522657	.0604783

```
    diff = mean(0) - mean(1)                                      t =  -1.6498
Ho: diff = 0                     degrees of freedom =       89

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0513         Pr(|T| > |t|) = 0.1025          Pr(T > t) = 0.9487

. ttest KPI_Performance_Ops, by(Innovation_focus2)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	60	4.616667	.124287	.9627233	4.367969	4.865364
1	52	4.423077	.148131	1.068188	4.125691	4.720462
combined	112	4.526786	.0957258	1.013066	4.337099	4.716473
diff		.1935897	.1919267		-.186764	.5739435

```
    diff = mean(0) - mean(1)                                      t =   1.0087
Ho: diff = 0                     degrees of freedom =      110

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.8423         Pr(|T| > |t|) = 0.3153          Pr(T > t) = 0.1577
```

Results hierarchical embedding

```
. ttest centralization , by(CEO_Reporting)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	91	4.914835	.1551034	1.479593	4.606695	5.222975
1	27	5.259259	.2540559	1.320113	4.73704	5.781479
combined	118	4.993644	.1331615	1.446504	4.729925	5.257363
diff		-.3444241	.3167524		-.9717921	.2829439

```
    diff = mean(0) - mean(1)                                      t =  -1.0874
Ho: diff = 0                     degrees of freedom =      116

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.1396         Pr(|T| > |t|) = 0.2791          Pr(T > t) = 0.8604

. ttest strategic_integration , by(CEO_Reporting)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	89	4.564607	.1310176	1.236017	4.304237	4.824977
1	26	5.201923	.2503917	1.276752	4.686232	5.717614
combined	115	4.708696	.1182656	1.268257	4.474412	4.942979
diff		-.6373163	.2775792		-1.187251	-.0873819

```
    diff = mean(0) - mean(1)                                      t =  -2.2960
Ho: diff = 0                     degrees of freedom =      113

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0118         Pr(|T| > |t|) = 0.0235          Pr(T > t) = 0.9882

. ttest performance_management , by(CEO_Reporting)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	83	5.161446	.1166915	1.06311	4.929309	5.393582
1	24	5.125	.2136001	1.046422	4.683135	5.566865
combined	107	5.153271	.1019499	1.054578	4.951145	5.355397
diff		.0364458	.2455494		-.4504332	.5233248

```
    diff = mean(0) - mean(1)                                      t =   0.1484
Ho: diff = 0                     degrees of freedom =      105

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.5589         Pr(|T| > |t|) = 0.8823          Pr(T > t) = 0.4411
```

```
. ttest support , by(CEO_Reporting)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      88    5.204545    .1453827    1.363811    4.915582    5.493509
       1 |      26    5.480769    .2261395    1.153089    5.015026    5.946512
---------+--------------------------------------------------------------------
combined |     114    5.267544    .1235347     1.31899    5.022799    5.512288
---------+--------------------------------------------------------------------
    diff |           -.2762238    .2945764               -.8598891    .3074416
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -0.9377
Ho: diff = 0                                     degrees of freedom =      112

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.1752         Pr(|T| > |t|) = 0.3504          Pr(T > t) = 0.8248

. ttest trust , by(CEO_Reporting)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      88    5.130682    .1194549    1.120587    4.893252    5.368111
       1 |      25        5.24    .1851126    .9255629    4.857946    5.622054
---------+--------------------------------------------------------------------
combined |     113    5.154867    .1013654     1.07753    4.954025     5.35571
---------+--------------------------------------------------------------------
    diff |           -.1093182    .2450844               -.5949693     .376333
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -0.4460
Ho: diff = 0                                     degrees of freedom =      111

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.3282         Pr(|T| > |t|) = 0.6564          Pr(T > t) = 0.6718

. ttest exploration_new , by(CEO_Reporting)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      90    4.501852    .1192551    1.131353    4.264895    4.738809
       1 |      26    4.666667     .252847    1.289272    4.145918    5.187415
---------+--------------------------------------------------------------------
combined |     116    4.538793    .1081464    1.164772    4.324576     4.75301
---------+--------------------------------------------------------------------
    diff |           -.1648148    .2600127               -.679898    .3502684
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -0.6339
Ho: diff = 0                                     degrees of freedom =      114

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.2637         Pr(|T| > |t|) = 0.5274          Pr(T > t) = 0.7363

. ttest exploitation_new , by(CEO_Reporting)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      91    4.739927     .116802     1.11422    4.507879    4.971974
       1 |      26     5.25641    .2126814    1.084467    4.818385    5.694436
---------+--------------------------------------------------------------------
combined |     117    4.854701    .1039061    1.123917    4.648902      5.0605
---------+--------------------------------------------------------------------
    diff |           -.5164835    .2463513               -1.004458    -.028509
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -2.0965
Ho: diff = 0                                     degrees of freedom =      115

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0191         Pr(|T| > |t|) = 0.0382          Pr(T > t) = 0.9809
```

```
. ttest Balance_content_multiplicative , by(CEO_Reporting)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      91    22.06761    1.020422    9.734201    20.04037    24.09486
       1 |      26    24.82959    2.064265    10.52573    20.57816    29.08103
---------+--------------------------------------------------------------------
combined |     117    22.68139    .9185821    9.935985    20.86202    24.50075
---------+--------------------------------------------------------------------
    diff |           -2.761981    2.204101               -7.127882    1.603919
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -1.2531
Ho: diff = 0                                     degrees of freedom =      115

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.1064         Pr(|T| > |t|) = 0.2127          Pr(T > t) = 0.8936

. ttest KPI_Performance_Fin , by(CEO_Reporting)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      79    4.860759    .1142751      1.0157    4.633255    5.088264
       1 |      24      4.9375    .2646308    1.296421     4.39007     5.48493
---------+--------------------------------------------------------------------
combined |     103    4.878641    .1065319     1.08118    4.667335    5.089946
---------+--------------------------------------------------------------------
    diff |           -.0767405    .2531276               -.5788776    .4253966
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -0.3032
Ho: diff = 0                                     degrees of freedom =      101

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.3812         Pr(|T| > |t|) = 0.7624          Pr(T > t) = 0.6188

. ttest KPI_Performance_Inno , by(CEO_Reporting)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      69    3.985507    .0979168    .8133582    3.790117    4.180897
       1 |      22    4.204545     .214867    1.007816    3.757705    4.651386
---------+--------------------------------------------------------------------
combined |      91    4.038462    .0905251    .8635546    3.858618    4.218305
---------+--------------------------------------------------------------------
    diff |           -.2190382    .2113469                -.63898    .2009036
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -1.0364
Ho: diff = 0                                     degrees of freedom =       89

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.1514         Pr(|T| > |t|) = 0.3028          Pr(T > t) = 0.8486

. ttest KPI_Performance_Ops, by(CEO_Reporting)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      87    4.482759    .1073509    1.001302    4.269352    4.696165
       1 |      25        4.68    .2118962    1.059481    4.242668    5.117332
---------+--------------------------------------------------------------------
combined |     112    4.526786    .0957258    1.013066    4.337099    4.716473
---------+--------------------------------------------------------------------
    diff |           -.1972414     .230164               -.6533725    .2588897
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -0.8570
Ho: diff = 0                                     degrees of freedom =      110

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.1967         Pr(|T| > |t|) = 0.3933          Pr(T > t) = 0.8033
```

Results procurement attention

```
. ttest centralization , by(Explorer_Attention)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	85	4.747059	.1586386	1.462576	4.431589	5.062529
1	33	5.628788	.210159	1.207272	5.200708	6.056868
combined	118	4.993644	.1331615	1.446504	4.729925	5.257363
diff		-.8817291	.2864928		-1.449164	-.314294

```
    diff = mean(0) - mean(1)                                      t =  -3.0777
Ho: diff = 0                                     degrees of freedom =      116

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0013         Pr(|T| > |t|) = 0.0026          Pr(T > t) = 0.9987

. ttest strategic_integration , by(Explorer_Attention)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	82	4.631098	.1380889	1.250448	4.356344	4.905851
1	33	4.901515	.228202	1.310921	4.436683	5.366347
combined	115	4.708696	.1182656	1.268257	4.474412	4.942979
diff		-.2704176	.2613715		-.7882417	.2474065

```
    diff = mean(0) - mean(1)                                      t =  -1.0346
Ho: diff = 0                                     degrees of freedom =      113

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.1515         Pr(|T| > |t|) = 0.3031          Pr(T > t) = 0.8485

. ttest performance_management , by(Explorer_Attention)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	76	5.081579	.1264455	1.102326	4.829687	5.333471
1	31	5.329032	.1652755	.920215	4.991495	5.66657
combined	107	5.153271	.1019499	1.054578	4.951145	5.355397
diff		-.2474533	.2245141		-.6926232	.1977166

```
    diff = mean(0) - mean(1)                                      t =  -1.1022
Ho: diff = 0                                     degrees of freedom =      105

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.1365         Pr(|T| > |t|) = 0.2729          Pr(T > t) = 0.8635
```

```
. ttest support , by(Explorer_Attention)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      82    5.164634     .152035    1.376735    4.862132    5.467136
       1 |      32     5.53125    .2007264     1.13548    5.121866    5.940634
---------+--------------------------------------------------------------------
combined |     114    5.267544    .1235347     1.31899    5.022799    5.512288
---------+--------------------------------------------------------------------
    diff |           -.3666159    .2739667               -.9094457     .176214
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -1.3382
Ho: diff = 0                     degrees of freedom =      112

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0918         Pr(|T| > |t|) = 0.1835          Pr(T > t) = 0.9082

. ttest trust , by(Explorer_Attention)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      81    5.018519    .1205839    1.085255    4.778549    5.258488
       1 |      32         5.5    .1753453    .9919027    5.142381    5.857619
---------+--------------------------------------------------------------------
combined |     113    5.154867    .1013654     1.07753    4.954025     5.35571
---------+--------------------------------------------------------------------
    diff |           -.4814815    .2213259               -.9200534   -.0429095
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -2.1754
Ho: diff = 0                     degrees of freedom =      111

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0159         Pr(|T| > |t|) = 0.0317          Pr(T > t) = 0.9841

. ttest exploration_new , by(Explorer_Attention)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      83    4.359438    .1323367    1.205644    4.096178    4.622698
       1 |      33    4.989899    .1612013    .9260311    4.661543    5.318255
---------+--------------------------------------------------------------------
combined |     116    4.538793    .1081464    1.164772    4.324576     4.75301
---------+--------------------------------------------------------------------
    diff |           -.6304612    .2333988               -1.092823      -.1681
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -2.7012
Ho: diff = 0                     degrees of freedom =      114

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0040         Pr(|T| > |t|) = 0.0080          Pr(T > t) = 0.9960

. ttest exploitation_new , by(Explorer_Attention)

Two-sample t test with equal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      84    4.769841    .1231708    1.128879     4.52486    5.014823
       1 |      33    5.070707    .1912202    1.098476    4.681204     5.46021
---------+--------------------------------------------------------------------
combined |     117    4.854701    .1039061    1.123917    4.648902      5.0605
---------+--------------------------------------------------------------------
    diff |           -.3008658    .2302019               -.7568514    .1551198
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -1.3070
Ho: diff = 0                     degrees of freedom =      115

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0969         Pr(|T| > |t|) = 0.1938          Pr(T > t) = 0.9031
```

```
. ttest Balance_content_multiplicative , by(Explorer_Attention)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	84	20.86351	1.068227	9.790459	18.73885	22.98817
1	33	27.30871	1.54232	8.859953	24.16711	30.45031
combined	117	22.68139	.9185821	9.935985	20.86202	24.50075
diff		-6.445203	1.960083		-10.32775	-2.562657

```
    diff = mean(0) - mean(1)                                      t =  -3.2882
Ho: diff = 0                                     degrees of freedom =      115

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0007         Pr(|T| > |t|) = 0.0013          Pr(T > t) = 0.9993

. ttest KPI_Performance_Fin , by(Explorer_Attention)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	71	4.760563	.1227859	1.034612	4.515675	5.005452
1	32	5.140625	.2035897	1.151677	4.725401	5.555849
combined	103	4.878641	.1065319	1.08118	4.667335	5.089946
diff		-.3800616	.2282287		-.832806	.0726828

```
    diff = mean(0) - mean(1)                                      t =  -1.6653
Ho: diff = 0                                     degrees of freedom =      101

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0495         Pr(|T| > |t|) = 0.0990          Pr(T > t) = 0.9505

. ttest KPI_Performance_Inno , by(Explorer_Attention)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	60	3.875	.1125118	.8715124	3.649864	4.100136
1	31	4.354839	.1375546	.7658715	4.073915	4.635763
combined	91	4.038462	.0905251	.8635546	3.858618	4.218305
diff		-.4798387	.1852225		-.8478719	-.1118055

```
    diff = mean(0) - mean(1)                                      t =  -2.5906
Ho: diff = 0                                     degrees of freedom =       89

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0056         Pr(|T| > |t|) = 0.0112          Pr(T > t) = 0.9944

. ttest KPI_Performance_Ops, by(Explorer_Attention)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	79	4.367089	.1087344	.9664529	4.150615	4.583562
1	33	4.909091	.1800339	1.034216	4.542374	5.275808
combined	112	4.526786	.0957258	1.013066	4.337099	4.716473
diff		-.5420023	.204503		-.9472793	-.1367253

```
    diff = mean(0) - mean(1)                                      t =  -2.6503
Ho: diff = 0                                     degrees of freedom =      110

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0046         Pr(|T| > |t|) = 0.0092          Pr(T > t) = 0.9954
```

Appendix 5: Comparison of coefficients in behavioral model employing Seemingly Unrelated Regression models

Equation	Obs	Parms	RMSE	R-sq	F-Stat	P
exploration_new	90	30	0.8178972	0.6425	3.59	0.000
exploitation_new	90	30	0.7288895	0.6548	3.79	0.000
Balance_content_multiplicative	90	30	7.146687	0.622	3.29	0.000

	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
exploration_new						
centralization	0.1316487	0.0791906	1.66	0.098	-0.0246125	0.28791
strategic_integration	-0.05724	0.1171789	-0.49	0.626	-0.2884611	0.1739811
performance_management	0.3121039	0.1381372	2.26	0.025	0.0395273	0.5846806
support	0.0969443	0.1118212	0.87	0.387	-0.1237047	0.3175933
trust	0.0497836	0.1183273	0.42	0.674	-0.1837034	0.2832706
Productservicebin	-0.8690515	0.3577206	-2.43	0.016	-1.574917	-0.1631861
Country	0.2604957	0.2140659	1.22	0.225	-0.1619058	0.6828971
Employees	0.086691	0.1574485	0.55	0.583	-0.2239913	0.3973733
Structural_separation5	-0.0116953	0.0576952	-0.2	0.84	-0.1255411	0.1021506
KPI__Imp_Savings	0.1148133	0.165002	0.7	0.487	-0.2107738	0.4404005
KPI_Imp_PampL_Impact	0.1263685	0.0876283	1.44	0.151	-0.0465423	0.2992793
KPI_Imp_Pay_terms	-0.1757692	0.091974	-1.91	0.058	-0.3572551	0.0057167
KPI_Imp_Quality	0.0113431	0.1157707	0.1	0.922	-0.2170993	0.2397855
KPI_Imp_Stakeholder_satisf	0.0612263	0.0904887	0.68	0.5	-0.1173288	0.2397813
KPI_Imp_Suppl_Reduction	0.0999102	0.0955225	1.05	0.297	-0.0885777	0.2883981
KPI_Imp_Time_to_market	0.0478396	0.0891767	0.54	0.592	-0.1281267	0.2238059
KPI_Imp_Del_rel	-0.1156459	0.1206234	-0.96	0.339	-0.3536637	0.1223718
KPI_Imp_Innovation	0.2507074	0.0898074	2.79	0.006	0.0734966	0.4279181
KPI_Imp_Invoice_reduction	-0.0687786	0.0773016	-0.89	0.375	-0.2213126	0.0837553
Industry_2	0.4454116	0.8929449	0.5	0.619	-1.316575	2.207398
Industry_3	1.219946	1.039665	1.17	0.242	-0.8315529	3.271445
Industry_4	0.9263542	1.091424	0.85	0.397	-1.227278	3.079986
Industry_5	-0.0988274	1.172305	-0.08	0.933	-2.412055	2.2144
Industry_6	0.6015017	1.048845	0.57	0.567	-1.468112	2.671115
Industry_7	1.337065	1.294198	1.03	0.303	-1.216686	3.890816
Industry_8	0.7897855	0.9851824	0.8	0.424	-1.154207	2.733778
Industry_9	-0.1643843	1.216045	-0.14	0.893	-2.563921	2.235152
Industry_10	2.186485	1.233753	1.77	0.078	-0.247995	4.620965
Industry_11	0.4762103	1.037292	0.46	0.647	-1.570607	2.523027
Industry_12	1.313409	1.322648	0.99	0.322	-1.296481	3.923298
Industry_13	0	(omitted)				
_cons	-0.6390332	1.655163	-0.39	0.7	-3.905052	2.626985

exploitation_new						
centralization	0.071903	0.0705726	1.02	0.31	-0.0673531	0.2111591
strategic_integration	0.094652	0.1044269	0.91	0.366	-0.1114065	0.3007105
performance_management	0.2370756	0.1231044	1.93	0.056	-0.0058379	0.4799891
support	0.1771038	0.0996522	1.78	0.077	-0.019533	0.3737407
trust	0.0136892	0.1054503	0.13	0.897	-0.1943886	0.221767
Productservicebin	0.3037755	0.3187917	0.95	0.342	-0.3252741	0.9328251
Country	0.0883583	0.1907702	0.46	0.644	-0.2880753	0.464792
Employees	0.1230073	0.1403142	0.88	0.382	-0.153865	0.3998796
Structural_separation5	0.0378625	0.0514165	0.74	0.462	-0.0635941	0.1393191
KPI__Imp_Savings	-0.0555507	0.1470457	-0.38	0.706	-0.3457058	0.2346044
KPI_Imp_PampL_Impact	0.1722854	0.0780921	2.21	0.029	0.0181915	0.3263792
KPI_Imp_Pay_terms	0.0369189	0.0819649	0.45	0.653	-0.1248168	0.1986546
KPI_Imp_Quality	-0.1068176	0.103172	-1.04	0.302	-0.3103998	0.0967645
KPI_Imp_Stakeholder_satisf	0.2965871	0.0806412	3.68	0	0.1374633	0.4557109
KPI_Imp_Suppl_Reduction	0.136692	0.0851273	1.61	0.11	-0.0312838	0.3046677
KPI_Imp_Time_to_market	-0.0615497	0.0794721	-0.77	0.44	-0.2183664	0.0952671
KPI_Imp_Del_rel	-0.2585882	0.1074965	-2.41	0.017	-0.4707037	-0.0464727
KPI_Imp_Innovation	0.0502582	0.0800341	0.63	0.531	-0.1076676	0.208184
KPI_Imp_Invoice_reduction	-0.0949575	0.0688893	-1.38	0.17	-0.2308919	0.040977
Industry_2	-0.3048657	0.7957702	-0.38	0.702	-1.875104	1.265373
Industry_3	-0.7415956	0.9265235	-0.8	0.425	-2.56984	1.086649
Industry_4	0.2360311	0.97265	0.24	0.809	-1.683232	2.155294
Industry_5	0.4815465	1.044729	0.46	0.645	-1.579944	2.543037
Industry_6	-0.8419912	0.9347046	-0.9	0.369	-2.686379	1.002397
Industry_7	0.7890475	1.153357	0.68	0.495	-1.486792	3.064887
Industry_8	-0.7524511	0.8779699	-0.86	0.393	-2.484888	0.9799862
Industry_9	-0.43846	1.083709	-0.4	0.686	-2.576867	1.699947
Industry_10	-1.099875	1.09949	-1	0.318	-3.269423	1.069672
Industry_11	-0.308624	0.924409	-0.33	0.739	-2.132696	1.515448
Industry_12	-0.7025767	1.178711	-0.6	0.552	-3.028445	1.623292
Industry_13	0	(omitted)				
_cons	1.121209	1.47504	0.76	0.448	-1.789385	4.031803

Balance_content_multiplicative						
centralization	1.245736	0.6919575	1.8	0.073	-0.1196558	2.611128
strategic_integration	-0.4903954	1.023895	-0.48	0.633	-2.510777	1.529987
performance_management	2.022881	1.207026	1.68	0.095	-0.3588612	4.404622
support	0.5202975	0.9770799	0.53	0.595	-1.407707	2.448302
trust	1.386832	1.033929	1.34	0.182	-0.6533495	3.427013
Productservicebin	-5.850434	3.12572	-1.87	0.063	-12.0182	0.3173318
Country	3.099297	1.870482	1.66	0.099	-0.5915962	6.79019
Employees	-0.4974023	1.375766	-0.36	0.718	-3.212107	2.217302
Structural_separation5	-0.0692101	0.5041333	-0.14	0.891	-1.063982	0.9255613
KPI__Imp_Savings	2.252008	1.441768	1.56	0.12	-0.592933	5.096949
KPI_Imp_PampL_Impact	1.384646	0.7656853	1.81	0.072	-0.126228	2.89552
KPI_Imp_Pay_terms	-1.346861	0.8036576	-1.68	0.095	-2.932663	0.238941
KPI_Imp_Quality	-0.1618855	1.011591	-0.16	0.873	-2.157987	1.834216
KPI_Imp_Stakeholder_satisf	0.2651482	0.7906791	0.34	0.738	-1.295044	1.825341
KPI_Imp_Suppl_Reduction	0.0763689	0.8346641	0.09	0.927	-1.570616	1.723354
KPI_Imp_Time_to_market	0.3389809	0.7792156	0.44	0.664	-1.198591	1.876553
KPI_Imp_Del_rel	-0.8621509	1.053992	-0.82	0.414	-2.941921	1.21762
KPI_Imp_Innovation	2.361885	0.7847263	3.01	0.003	0.8134383	3.910331
KPI_Imp_Invoice_reduction	-0.4234602	0.6754522	-0.63	0.532	-1.756283	0.9093628
Industry_2	5.863088	7.802445	0.75	0.453	-9.532936	21.25911
Industry_3	13.42895	9.084467	1.48	0.141	-4.496803	31.3547
Industry_4	9.539094	9.536733	1	0.319	-9.279082	28.35727
Industry_5	3.447665	10.24346	0.34	0.737	-16.76504	23.66037
Industry_6	4.930143	9.164682	0.54	0.591	-13.15389	23.01418
Industry_7	16.36856	11.30854	1.45	0.15	-5.94581	38.68293
Industry_8	5.43807	8.608404	0.63	0.528	-11.5483	22.42444
Industry_9	-0.6561434	10.62565	-0.06	0.951	-21.623	20.31072
Industry_10	19.04721	10.78039	1.77	0.079	-2.224981	40.3194
Industry_11	2.925329	9.063735	0.32	0.747	-14.95951	20.81017
Industry_12	5.480227	11.55714	0.47	0.636	-17.32467	28.28512
Industry_13	0	(omitted)				
_cons	-26.6835	14.46261	-1.84	0.067	-55.22158	1.854574

Variable	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
[exploration_new]centralization - [exploitation_new]centralization = 0	0.0597457	0.1067244	0.56	0.576	-0.1508461	0.2703376
[exploration_new]strategic_integration - [exploitation_new]strategic_integration = 0	-0.151892	0.157921	-0.96	0.337	-0.4635065	0.1597226
[exploration_new]performance_management - [exploitation_new]performance_management = 0	0.0750283	0.1861663	0.4	0.687	-0.2923207	0.4423773
[exploration_new]support - [exploitation_new]support = 0	0.0801595	0.1507004	-0.53	0.595	-0.3775261	0.2172071
[exploration_new]trust - [exploitation_new]trust = 0	0.0360944	0.1594686	0.23	0.821	-0.2785739	0.3507627
[exploration_new]centralization - [Balance_content_multiplicative]centralization = 0	-1.114087	0.6228442	-1.79	0.075	-2.343103	0.114928
[exploration_new]strategic_integration - [Balance_content_multiplicative]strategic_integration = 0	0.4331555	0.9216278	0.47	0.639	-1.385429	2.25174
[exploration_new]performance_management - [Balance_content_multiplicative]performance_management = 0	-1.710777	1.086468	-1.57	0.117	-3.854628	0.4330746
[exploration_new]support - [Balance_content_multiplicative]support = 0	-0.4233532	0.8794883	-0.48	0.631	-2.158787	1.31208
-[exploration_new]trust - [Balance_content_multiplicative]trust = 0	1.337048	0.9306595	-1.44	0.153	-3.173454	0.499358
-[exploitation_new]centralization + [Balance_content_multiplicative]centralization = 0	1.173833	0.6895611	1.7	0.09	-0.1868302	2.534496
- [exploitation_new]strategic_integration + [Balance_content_multiplicative]strategic_integration = 0	-0.5850474	1.020349	-0.57	0.567	-2.598432	1.428338
- [exploitation_new]performance_management + [Balance_content_multiplicative]performance_management = 0	1.785805	1.202846	1.48	0.139	-0.5876883	4.159298
- [exploitation_new]support + [Balance_content_multiplicative]support = 0	0.3431937	0.9736961	0.35	0.725	-1.578133	2.264521
- [exploitation_new]trust + [Balance_content_multiplicative]trust = 0	1.373143	1.030349	1.33	0.184	-0.6599731	3.406258

Appendix 6: Comparison of coefficients in performance model employing Seemingly Unrelated Regression models

	Obs	Parms	RMSE	R-sq	F-Stat	P
KPI_Performance_Fin	78	27	0.9379813	0.5446	2.26	0.001
KPI_Performance_Inno	78	27	0.8143888	0.4352	1.46	0.0822
KPI_Performance_Ops	78	27	1.033513	0.3585	1.06	0.4005

	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
KPI_Performance_Fin						
exploration_new	-0.2590446	0.3343369	-0.77	0.44	-0.9195574	0.4014682
exploitation_new	-0.1747682	0.167738	-1.04	0.299	-0.5061497	0.1566134
Balance_content_multiplicative	0.0791392	0.0391304	2.02	0.045	0.0018336	0.1564447
Productservicebin	0.6332194	0.5053049	1.25	0.212	-0.3650561	1.631495
Country	0.4035017	0.2687674	1.5	0.135	-0.1274727	0.934476
Employees	0.1275716	0.1907977	0.67	0.505	-0.2493664	0.5045096
KPI__Imp_Savings	0.0832693	0.2009518	0.41	0.679	-0.3137292	0.4802679
KPI_Imp_PampL_Impact	0.0838427	0.1219901	0.69	0.493	-0.1571597	0.3248452
KPI_Imp_Pay_terms	0.4928211	0.1148093	4.29	0	0.2660049	0.7196373
KPI_Imp_Quality	-0.044401	0.1681406	-0.26	0.792	-0.376578	0.2877759
KPI_Imp_Stakeholder_satisf	0.1363713	0.1245039	1.1	0.275	-0.1095975	0.3823401
KPI_Imp_Suppl_Reduction	-0.2641941	0.1105007	-2.39	0.018	-0.4824982	-0.0458901
KPI_Imp_Time_to_market	0.0255065	0.1077671	0.24	0.813	-0.1873971	0.23841
KPI_Imp_Del_rel	0.0531122	0.1410692	0.38	0.707	-0.2255828	0.3318073
KPI_Imp_Innovation	-0.1619582	0.1156834	-1.4	0.164	-0.3905013	0.0665848
KPI_Imp_Invoice_reduction	-0.0578082	0.0980342	-0.59	0.556	-0.2514837	0.1358672
Industry_2	-0.8836632	1.051912	-0.84	0.402	-2.961811	1.194484
Industry_3	-1.495866	1.267342	-1.18	0.24	-3.999614	1.007882
Industry_4	-0.3814978	1.509077	-0.25	0.801	-3.362815	2.59982
Industry_5	-0.1867318	1.429347	-0.13	0.896	-3.010536	2.637073
Industry_6	-2.12215	1.273041	-1.67	0.098	-4.637158	0.3928574
Industry_7	-0.3301293	1.513902	-0.22	0.828	-3.32098	2.660722
Industry_8	-1.453926	1.197217	-1.21	0.226	-3.819136	0.9112845
Industry_9	-1.21106	1.427981	-0.85	0.398	-4.032165	1.610046
Industry_10	-0.2885053	1.560946	-0.18	0.854	-3.372296	2.795285
Industry_11	-1.343971	1.182224	-1.14	0.257	-3.679562	0.991619
Industry_12	-1.983633	1.566311	-1.27	0.207	-5.078022	1.110756
Industry_13	0	(omitted)				
_cons	3.057727	2.328974	1.31	0.191	-1.543371	7.658826

KPI_Performance_Inno						
exploration_new	0.2154183	0.2902832	0.74	0.459	-0.3580625	0.788899
exploitation_new	0.1324342	0.1456361	0.91	0.365	-0.155283	0.4201515
Balance_content_multiplicative	0.0041516	0.0339744	0.12	0.903	-0.0629678	0.071271
Productservicebin	0.4375058	0.4387237	1	0.32	-0.4292326	1.304244
Country	0.3718887	0.2333535	1.59	0.113	-0.0891222	0.8328996
Employees	0.1290265	0.1656573	0.78	0.437	-0.1982445	0.4562975
KPI__Imp_Savings	0.1039784	0.1744736	0.6	0.552	-0.2407099	0.4486667
KPI_Imp_PampL_Impact	-0.1765206	0.1059161	-1.67	0.098	-0.3857676	0.0327263
KPI_Imp_Pay_terms	0.1424675	0.0996816	1.43	0.155	-0.0544625	0.3393974
KPI_Imp_Quality	-0.0149134	0.1459857	-0.1	0.919	-0.3033212	0.2734945
KPI_Imp_Stakeholder_satisf	-0.1119889	0.1080988	-1.04	0.302	-0.3255477	0.10157
KPI_Imp_Suppl_Reduction	-0.0429575	0.0959406	-0.45	0.655	-0.2324969	0.1465819
KPI_Imp_Time_to_market	0.1408566	0.0935672	1.51	0.134	-0.0439939	0.325707
KPI_Imp_Del_rel	-0.044435	0.1224813	-0.36	0.717	-0.286408	0.197538
KPI_Imp_Innovation	0.1139205	0.1004405	1.13	0.258	-0.0845088	0.3123497
KPI_Imp_Invoice_reduction	-0.0588112	0.0851168	-0.69	0.491	-0.2269671	0.1093447
Industry_2	-0.4338833	0.9133076	-0.48	0.635	-2.238205	1.370438
Industry_3	-0.2772067	1.100351	-0.25	0.801	-2.45105	1.896637
Industry_4	-0.6440887	1.310234	-0.49	0.624	-3.232575	1.944397
Industry_5	0.6627892	1.24101	0.53	0.594	-1.788939	3.114517
Industry_6	-1.461705	1.1053	-1.32	0.188	-3.645324	0.7219144
Industry_7	-1.160219	1.314424	-0.88	0.379	-3.756982	1.436545
Industry_8	-1.148516	1.039466	-1.1	0.271	-3.202076	0.905044
Industry_9	-0.4491616	1.239824	-0.36	0.718	-2.898546	2.000223
Industry_10	0.2455294	1.355269	0.18	0.856	-2.431927	2.922986
Industry_11	-0.9814693	1.026449	-0.96	0.34	-3.009312	1.046374
Industry_12	-1.440881	1.359927	-1.06	0.291	-4.12754	1.245778
Industry_13	0	(omitted)				
_cons	1.976341	2.022098	0.98	0.33	-2.018497	5.971179
KPI_Performance_Ops						
exploration_new	-0.1530662	0.3683886	-0.42	0.678	-0.8808511	0.5747186
exploitation_new	0.0481189	0.1848218	0.26	0.795	-0.3170133	0.413251
Balance_content_multiplicative	0.0262801	0.0431157	0.61	0.543	-0.0588989	0.1114591
Productservicebin	0.8585123	0.5567693	1.54	0.125	-0.2414358	1.95846
Country	0.3534509	0.2961409	1.19	0.235	-0.2316023	0.9385041
Employees	0.001601	0.2102301	0.01	0.994	-0.4137275	0.4169295
KPI__Imp_Savings	0.2970603	0.2214184	1.34	0.182	-0.1403719	0.7344924
KPI_Imp_PampL_Impact	-0.1231137	0.1344146	-0.92	0.361	-0.3886618	0.1424344
KPI_Imp_Pay_terms	0.1108873	0.1265025	0.88	0.382	-0.1390298	0.3608044
KPI_Imp_Quality	0.3422368	0.1852654	1.85	0.067	-0.0237718	0.7082454
KPI_Imp_Stakeholder_satisf	0.0068575	0.1371844	0.05	0.96	-0.2641627	0.2778778
KPI_Imp_Suppl_Reduction	0.0053839	0.121755	0.04	0.965	-0.2351541	0.2459219
KPI_Imp_Time_to_market	-0.0259311	0.118743	-0.22	0.827	-0.2605186	0.2086563
KPI_Imp_Del_rel	0.1095544	0.1554369	0.7	0.482	-0.1975253	0.416634
KPI_Imp_Innovation	0.0167476	0.1274656	0.13	0.896	-0.2350722	0.2685673
KPI_Imp_Invoice_reduction	0.0006097	0.1080188	0.01	0.996	-0.2127913	0.2140107
Industry_2	-0.4744127	1.159048	-0.41	0.683	-2.764216	1.81539
Industry_3	0.5508084	1.396418	0.39	0.694	-2.207942	3.309559
Industry_4	-1.186818	1.662774	-0.71	0.476	-4.471778	2.098141
Industry_5	0.7975988	1.574924	0.51	0.613	-2.313805	3.909003
Industry_6	-1.780814	1.402698	-1.27	0.206	-4.551971	0.9903424
Industry_7	-0.9880179	1.668091	-0.59	0.555	-4.283482	2.307446
Industry_8	-1.025982	1.319151	-0.78	0.438	-3.632085	1.580121
Industry_9	-0.3178204	1.573419	-0.2	0.84	-3.426251	2.79061
Industry_10	-1.223838	1.719926	-0.71	0.478	-4.621707	2.174031
Industry_11	-0.9654688	1.302632	-0.74	0.46	-3.538935	1.607998
Industry_12	-1.996487	1.725837	-1.16	0.249	-5.406034	1.41306
Industry_13	0	(omitted)				
_cons	0.1925297	2.566176	0.08	0.94	-4.877183	5.262242

Variable	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
[KPI_Performance_Fin]exploration_new - [KPI_Performance_Inno]exploration_new = 0	0.4744629	0.41762	-1.14	0.258	-1.299509	0.3505832
[KPI_Performance_Fin]exploration_new - [KPI_Performance_Ops]exploration_new = 0	0.1059784	0.439065	-0.24	0.81	-0.9733909	0.7614342
- [KPI_Performance_Inno]exploration_new + [KPI_Performance_Ops]exploration_new = 0	0.3684845	0.365834	-1.01	0.315	-1.091223	0.3542537
[KPI_Performance_Fin]exploitation_new - [KPI_Performance_Inno]exploitation_new = 0	-0.3072024	0.2095214	-1.47	0.145	-0.7211308	0.1067261
[KPI_Performance_Fin]exploitation_new - [KPI_Performance_Ops]exploitation_new = 0	-0.222887	0.2202804	-1.01	0.313	-0.6580709	0.2122968
- [KPI_Performance_Inno]exploitation_new + [KPI_Performance_Ops]exploitation_new = 0	-0.0843153	0.1835402	-0.46	0.647	-0.4469156	0.2782849
[KPI_Performance_Fin]Balance_content_multiplicative - [KPI_Performance_Inno]Balance_content_multiplicative = 0	0.0749876	0.0488777	1.53	0.127	-0.0215747	0.1715499
[KPI_Performance_Fin]Balance_content_multiplicative - [KPI_Performance_Ops]Balance_content_multiplicative = 0	0.0528591	0.0513876	1.03	0.305	-0.0486618	0.1543799
- [KPI_Performance_Inno]Balance_content_multiplicative + [KPI_Performance_Ops]Balance_content_multiplicative = 0	0.0221285	0.0428167	0.52	0.606	-0.0624598	0.1067169

Appendix 7: Robustness analysis through structural equation models

Full structural model

	OIM					
	Standardized	Std. Err.	z	P>z	[95% Conf.	Interval]
Structural						
exploration_new <-						
centralization	0.153	0.080	1.910	0.056	-0.004	0.311
strategic_integration	0.074	0.101	0.730	0.464	-0.124	0.271
performance_management	0.440	0.101	4.370	0.000	0.242	0.637
support	-0.033	0.100	-0.330	0.743	-0.229	0.163
trust	0.120	0.099	1.220	0.222	-0.073	0.313
_cons	0.451	0.451	1.000	0.317	-0.432	1.334
exploitation_new <-						
centralization	0.076	0.080	0.950	0.343	-0.081	0.232
strategic_integration	0.284	0.099	2.860	0.004	0.089	0.478
performance_management	0.260	0.102	2.550	0.011	0.060	0.459
support	0.234	0.099	2.370	0.018	0.040	0.427
trust	-0.120	0.097	-1.240	0.216	-0.311	0.070
_cons	1.386	0.487	2.850	0.004	0.432	2.340
Balance_content_multiplicative <						
centralization	0.156	0.081	1.940	0.053	-0.002	0.314
strategic_integration	0.096	0.102	0.940	0.347	-0.104	0.295
performance_management	0.317	0.102	3.110	0.002	0.117	0.518
support	0.009	0.101	0.090	0.927	-0.188	0.207
trust	0.197	0.098	2.000	0.045	0.004	0.390
_cons	-1.136	0.390	-2.910	0.004	-1.900	-0.371
KPI_Performance_Fin <-						
exploration_new	-0.578	0.276	-2.090	0.036	-1.119	-0.037
exploitation_new	-0.044	0.107	-0.410	0.678	-0.253	0.165
Balance_content_multiplicative	0.864	0.267	3.230	0.001	0.340	1.388
_cons	4.966	0.722	6.870	0.000	3.550	6.382
KPI_Performance_Inno <-						
exploration_new	0.278	0.289	0.960	0.336	-0.288	0.844
exploitation_new	-0.015	0.109	-0.130	0.893	-0.229	0.199
Balance_content_multiplicative	0.050	0.291	0.170	0.864	-0.520	0.620
_cons	3.508	0.773	4.540	0.000	1.994	5.022
KPI_Performance_Ops <-						
exploration_new	-0.303	0.260	-1.160	0.244	-0.812	0.206
exploitation_new	0.103	0.101	1.020	0.309	-0.095	0.300
Balance_content_multiplicative	0.505	0.258	1.960	0.050	-0.001	1.011
_cons	4.051	0.674	6.010	0.000	2.730	5.372
mean(centralization)	3.467	0.244	14.220	0.000	2.989	3.945
mean(strategic_integration)	3.723	0.262	14.180	0.000	3.208	4.237
mean(performance_management)	4.883	0.345	14.170	0.000	4.207	5.558
mean(support)	4.033	0.281	14.370	0.000	3.482	4.583
mean(trust)	4.782	0.332	14.400	0.000	4.131	5.433

var(e.exploration_new)	0.628	0.072			0.501	0.787
var(e.exploitation_new)	0.623	0.072			0.497	0.781
var(e.Balance_content_multiplicative)	0.640	0.072			0.514	0.796
var(e.KPI_Performance_Fin)	0.866	0.063			0.751	1.000
var(e.KPI_Performance_Inno)	0.898	0.060			0.788	1.023
var(e.KPI_Performance_Ops)	0.913	0.050			0.820	1.017
var(centralization)	1.000	.			.	.
var(strategic_integration)	1.000	.			.	.
var(performance_management)	1.000	.			.	.
var(support)	1.000	.			.	.
var(trust)	1.000	.			.	.
cov(e.exploration_new ,e.exploitation_new)	0.057	0.093	0.610	0.543	-0.126	0.240
cov(e.exploration_new ,e.Balance_content_multiplicative)	0.913	0.016	58.160	0.000	0.882	0.943
cov(e.exploitation_new ,e.Balance_content_multiplicative)	0.091	0.093	0.980	0.325	-0.090	0.273
cov(e.KPI_Performance_Fin,e.KPI_Performance_Inno)	0.162	0.104	1.550	0.121	-0.043	0.366
cov(e.KPI_Performance_Fin,e.KPI_Performance_Ops)	0.186	0.095	1.960	0.050	0.000	0.371
cov(e.KPI_Performance_Inno,e.KPI_Performance_Ops)	0.385	0.088	4.390	0.000	0.213	0.556
cov(centralization,strategic_integration)	0.350	0.081	4.300	0.000	0.190	0.510
cov(centralization,performance_management)	0.266	0.089	2.990	0.003	0.092	0.440
cov(centralization,support)	0.296	0.085	3.500	0.000	0.130	0.462
cov(centralization,trust)	0.323	0.083	3.890	0.000	0.160	0.486
cov(strategic_integration,performance_management)	0.567	0.065	8.760	0.000	0.440	0.693
cov(strategic_integration,support)	0.535	0.067	8.040	0.000	0.405	0.666
cov(strategic_integration,trust)	0.510	0.069	7.370	0.000	0.374	0.646
cov(performance_management,support)	0.581	0.063	9.280	0.000	0.458	0.703
cov(performance_management,trust)	0.557	0.066	8.460	0.000	0.428	0.686
cov(support,trust)	0.554	0.065	8.560	0.000	0.427	0.681

LR test of model vs. saturated: chi2(15) = 22.12, Prob > chi2 = 0.105

Fit statistic	Value	Description
Likelihood ratio		
chi2_ms(15)	22.121	model vs. saturated
p > chi2	0.105	
chi2_bs(45)	435.258	baseline vs. saturated
p > chi2	0.000	
Population error		
RMSEA	0.063	Root mean squared error of approximation
90% CI, lower bound	0.000	
upper bound	0.116	
pclose	0.313	Probability RMSEA <= 0.05
Information criteria		
AIC	3815.914	Akaike's information criterion
BIC	3987.697	Bayesian information criterion
Baseline comparison		
CFI	0.982	Comparative fit index
TLI	0.945	Tucker-Lewis index

Partial structural model – Balance of exploration and exploitation removed

	Standardized	OIM Std. Err.	z	P>z	[95% Conf.	Interval]
Structural						
exploration_new <-						
centralization	0.143	0.081	1.78	0.076	-0.015	0.302
strategic_integration	0.068	0.099	0.68	0.494	-0.127	0.263
performance_management	0.415	0.103	4.02	0.000	0.213	0.617
support	-0.024	0.101	-0.24	0.813	-0.221	0.174
trust	0.150	0.099	1.51	0.131	-0.045	0.345
_cons	0.514	0.458	1.12	0.262	-0.383	1.412
exploitation_new <-						
centralization	0.078	0.080	0.97	0.330	-0.079	0.235
strategic_integration	0.283	0.100	2.84	0.005	0.087	0.478
performance_management	0.255	0.102	2.49	0.013	0.054	0.456
support	0.235	0.099	2.37	0.018	0.040	0.429
trust	-0.118	0.098	-1.21	0.227	-0.309	0.073
_cons	1.381	0.489	2.83	0.005	0.424	2.339
KPI_Performance_Fin <-						
exploration_new	0.225	0.102	2.2	0.028	0.025	0.425
exploitation_new	-0.010	0.110	-0.09	0.929	-0.226	0.207
_cons	3.685	0.655	5.63	0.000	2.402	4.969
KPI_Performance_Inno <-						
exploration_new	0.367	0.098	3.76	0.000	0.176	0.559
exploitation_new	-0.020	0.106	-0.19	0.852	-0.227	0.188
_cons	3.252	0.648	5.02	0.000	1.982	4.523
KPI_Performance_Ops <-						
exploration_new	0.161	0.098	1.64	0.100	-0.031	0.353
exploitation_new	0.128	0.101	1.27	0.203	-0.069	0.326
_cons	3.302	0.579	5.7	0.000	2.167	4.437
mean(centralization)	3.467	0.244	14.22	0.000	2.989	3.945
mean(strategic_integration)	3.725	0.262	14.19	0.000	3.211	4.239
mean(performance_management)	4.913	0.345	14.25	0.000	4.237	5.588
mean(support)	4.033	0.281	14.37	0.000	3.483	4.584
mean(trust)	4.779	0.332	14.39	0.000	4.128	5.431
var(e.exploration_new)	0.636	0.073			0.508	0.796
var(e.exploitation_new)	0.625	0.072			0.499	0.783
var(e.KPI_Performance_Fin)	0.951	0.043			0.870	1.039
var(e.KPI_Performance_Inno)	0.870	0.066			0.750	1.009
var(e.KPI_Performance_Ops)	0.943	0.042			0.864	1.030
var(centralization)	1.000	.			.	.
var(strategic_integration)	1.000	.			.	.
var(performance_management)	1.000	.			.	.
var(support)	1.000	.			.	.
var(trust)	1.000	.			.	.
cov(e.exploration_new ,e.exploitation_new)	0.039	0.094	0.42	0.676	-0.145	0.223
cov(e.KPI_Performance_Fin,e.KPI_Performance_Inno)	0.174	0.103	1.68	0.093	-0.029	0.376
cov(e.KPI_Performance_Fin,e.KPI_Performance_Ops)	0.232	0.093	2.5	0.012	0.050	0.413
cov(e.KPI_Performance_Inno,e.KPI_Performance_Ops)	0.386	0.088	4.41	0.000	0.214	0.557
cov(centralization,strategic_integration)	0.349	0.081	4.29	0.000	0.190	0.509
cov(centralization,performance_management)	0.260	0.089	2.92	0.004	0.085	0.435
cov(centralization,support)	0.296	0.085	3.5	0.000	0.130	0.462
cov(centralization,trust)	0.323	0.083	3.89	0.000	0.160	0.486
cov(strategic_integration,performance_management)	0.567	0.065	8.75	0.000	0.440	0.694
cov(strategic_integration,support)	0.535	0.067	8.04	0.000	0.405	0.666
cov(strategic_integration,trust)	0.511	0.069	7.38	0.000	0.375	0.646
cov(performance_management,support)	0.583	0.062	9.36	0.000	0.461	0.705
cov(performance_management,trust)	0.555	0.066	8.41	0.000	0.426	0.685
cov(support,trust)	0.555	0.065	8.57	0.000	0.428	0.681

LR test of model vs. saturated: chi2(15) = 24.89, Prob > chi2 = 0.051

Fit statistic	Value	Description
Likelihood ratio		
chi2_ms(15)	24.890	model vs. saturated
p > chi2	0.051	
chi2_bs(45)	172.977	baseline vs. saturated
p > chi2	0.000	
Population error		
RMSEA	0.075	Root mean squared error of approximation
90% CI, lower bound	0.000	
upper bound	0.125	
pclose	0.200	Probability RMSEA <= 0.05
Information criteria		
AIC	3188.635	Akaike's information criterion
BIC	3327.169	Bayesian information criterion
Baseline comparison		
CFI	0.928	Comparative fit index
TLI	0.833	Tucker-Lewis index

Partial model – Exploration removed

	OIM					
	Standardized	Std. Err.	z	P>z	[95% Conf.	Interval]
Structural						
exploitation_new <-						
centralization	0.079	0.080	0.98	0.325	-0.078	0.236
strategic_integration	0.287	0.100	2.88	0.004	0.092	0.483
performance_management	0.244	0.103	2.36	0.018	0.041	0.446
support	0.236	0.099	2.37	0.018	0.041	0.431
trust	-0.114	0.098	-1.16	0.244	-0.305	0.078
_cons	1.386	0.491	2.82	0.005	0.423	2.349
Balance_content_multiplicative <						
centralization	0.160	0.081	1.98	0.048	0.001	0.318
strategic_integration	0.100	0.102	0.98	0.328	-0.101	0.301
performance_management	0.299	0.104	2.88	0.004	0.095	0.502
support	0.011	0.102	0.1	0.918	-0.189	0.210
trust	0.205	0.099	2.08	0.038	0.012	0.398
_cons	-1.135	0.395	-2.87	0.004	-1.910	-0.361
KPI_Performance_Fin <-						
exploitation_new	-0.052	0.109	-0.48	0.633	-0.265	0.161
Balance_content_multiplicative	0.328	0.096	3.4	0.001	0.139	0.517
_cons	3.998	0.585	6.83	0.000	2.851	5.146
KPI_Performance_Inno <-						
exploitation_new	-0.012	0.110	-0.11	0.911	-0.228	0.203
Balance_content_multiplicative	0.309	0.103	3	0.003	0.107	0.510
_cons	3.978	0.597	6.66	0.000	2.806	5.149
KPI_Performance_Ops <-						
exploitation_new	0.097	0.102	0.96	0.338	-0.102	0.296
Balance_content_multiplicative	0.223	0.097	2.3	0.021	0.033	0.414
_cons	3.556	0.531	6.69	0.000	2.515	4.597
mean(centralization)	3.467	0.244	14.22	0.000	2.989	3.945
mean(strategic_integration)	3.723	0.262	14.18	0.000	3.208	4.237
mean(performance_management)	4.943	0.345	14.32	0.000	4.267	5.620
mean(support)	4.033	0.281	14.37	0.000	3.483	4.583
mean(trust)	4.778	0.332	14.38	0.000	4.127	5.429
var(e.exploitation_new)	0.627	0.072			0.501	0.785
var(e.Balance_content_multiplicative)	0.646	0.072			0.519	0.802
var(e.KPI_Performance_Fin)	0.903	0.056			0.799	1.020
var(e.KPI_Performance_Inno)	0.908	0.057			0.802	1.027
var(e.KPI_Performance_Ops)	0.924	0.048			0.835	1.022
var(centralization)	1.000	.		.	.	
var(strategic_integration)	1.000	.		.	.	
var(performance_management)	1.000	.		.	.	
var(support)	1.000	.		.	.	
var(trust)	1.000	.		.	.	
cov(e.exploitation_new ,e.Balance_content_multiplicative)	0.098	0.092	1.06	0.288	-0.083	0.279
cov(e.KPI_Performance_Fin,e.KPI_Performance_Inno)	0.150	0.105	1.43	0.154	-0.056	0.356
cov(e.KPI_Performance_Fin,e.KPI_Performance_Ops)	0.206	0.094	2.2	0.028	0.022	0.390
cov(e.KPI_Performance_Inno,e.KPI_Performance_Ops)	0.368	0.089	4.15	0.000	0.194	0.542
cov(centralization,strategic_integration)	0.350	0.081	4.3	0.000	0.190	0.510
cov(centralization,performance_management)	0.254	0.090	2.83	0.005	0.078	0.430
cov(centralization,support)	0.296	0.085	3.49	0.000	0.130	0.462
cov(centralization,trust)	0.323	0.083	3.88	0.000	0.160	0.486
cov(strategic_integration,performance_management)	0.567	0.065	8.75	0.000	0.440	0.694
cov(strategic_integration,support)	0.535	0.067	8.04	0.000	0.405	0.666
cov(strategic_integration,trust)	0.510	0.069	7.38	0.000	0.375	0.646
cov(performance_management,support)	0.585	0.062	9.43	0.000	0.464	0.707
cov(performance_management,trust)	0.552	0.067	8.3	0.000	0.422	0.683
cov(support,trust)	0.555	0.065	8.57	0.000	0.428	0.681

LR test of model vs. saturated: chi2(15) = 20.67, Prob > chi2 = 0.148

Fit statistic	Value	Description
Likelihood ratio		
chi2_ms(15)	20.668	model vs. saturated
p > chi2	0.148	
chi2_bs(45)	171.381	baseline vs. saturated
p > chi2	0.000	
Population error		
RMSEA	0.057	Root mean squared error of approximation
90% CI, low er bound	0.000	
upper bound	0.111	
pclose	0.386	Probability RMSEA <= 0.05
Information criteria		
AIC	3690.763	Akaike's information criterion
BIC	3829.297	Bayesian information criterion
Baseline comparison		
CFI	0.958	Comparative fit index
TLI	0.903	Tucker-Lew is index

Partial model with only balance of exploration and exploitation

	Standardized	OIM Std. Err.	z	P>z	[95% Conf.	Interval]
Structural						
Balance_content_multiplicative <						
centralization	0.160	0.081	1.98	0.048	0.001	0.318
strategic_integration	0.099	0.103	0.96	0.337	-0.103	0.300
performance_management	0.292	0.105	2.79	0.005	0.087	0.498
support	0.012	0.102	0.12	0.907	-0.188	0.212
trust	0.209	0.099	2.11	0.035	0.015	0.402
_cons	-1.123	0.396	-2.83	0.005	-1.899	-0.346
KPI_Performance_Fin <-						
Balance_content_multiplicative	0.313	0.091	3.45	0.001	0.135	0.492
_cons	3.797	0.424	8.96	0.000	2.967	4.627
KPI_Performance_Inno <-						
Balance_content_multiplicative	0.305	0.094	3.23	0.001	0.120	0.490
_cons	3.934	0.464	8.47	0.000	3.023	4.844
KPI_Performance_Ops <-						
Balance_content_multiplicative	0.263	0.087	3.01	0.003	0.092	0.434
_cons	3.885	0.397	9.78	0.000	3.107	4.664
mean(centralization)	3.467	0.244	14.22	0.000	2.989	3.945
mean(strategic_integration)	3.740	0.262	14.26	0.000	3.226	4.254
mean(performance_management)	4.942	0.345	14.31	0.000	4.265	5.619
mean(support)	4.030	0.281	14.35	0.000	3.479	4.580
mean(trust)	4.773	0.332	14.36	0.000	4.121	5.424
var(e.Balance_content_multiplicative)	0.648	0.072			0.522	0.805
var(e.KPI_Performance_Fin)	0.902	0.057			0.797	1.021
var(e.KPI_Performance_Inno)	0.907	0.058			0.801	1.027
var(e.KPI_Performance_Ops)	0.931	0.046			0.845	1.025
var(centralization)	1.000	.		.	.	
var(strategic_integration)	1.000	.		.	.	
var(performance_management)	1.000	.		.	.	
var(support)	1.000	.		.	.	
var(trust)	1.000	.		.	.	
cov(e.KPI_Performance_Fin,e.KPI_Performance_Inno)	0.149	0.105	1.42	0.155	-0.057	0.355
cov(e.KPI_Performance_Fin,e.KPI_Performance_Ops)	0.199	0.094	2.13	0.033	0.016	0.383
cov(e.KPI_Performance_Inno,e.KPI_Performance_Ops)	0.364	0.089	4.11	0.000	0.191	0.538
cov(centralization,strategic_integration)	0.342	0.082	4.17	0.000	0.181	0.503
cov(centralization,performance_management)	0.259	0.090	2.89	0.004	0.084	0.435
cov(centralization,support)	0.297	0.085	3.51	0.000	0.131	0.463
cov(centralization,trust)	0.322	0.083	3.87	0.000	0.159	0.485
cov(strategic_integration,performance_management)	0.569	0.065	8.82	0.000	0.443	0.696
cov(strategic_integration,support)	0.538	0.066	8.13	0.000	0.408	0.668
cov(strategic_integration,trust)	0.510	0.069	7.36	0.000	0.374	0.646
cov(performance_management,support)	0.588	0.062	9.53	0.000	0.467	0.709
cov(performance_management,trust)	0.553	0.067	8.32	0.000	0.423	0.684
cov(support,trust)	0.555	0.065	8.56	0.000	0.428	0.681

LR test of model vs. saturated: chi2(15) = 20.55, Prob > chi2 = 0.152

Fit statistic	Value	Description
Likelihood ratio		
chi2_ms(15)	20.55	model vs. saturated
p > chi2	0.152	
chi2_bs(45)	115.035	baseline vs. saturated
p > chi2	0.000	
Population error		
RMSEA	0.056	Root mean squared error of approximation
90% CI, lower bound	0.000	
upper bound	0.11	
pclose	0.392	Probability RMSEA <= 0.05
Information criteria		
AIC	3366.628	Akaike's information criterion
BIC	3474.684	Bayesian information criterion
Baseline comparison		
CFI	0.938	Comparative fit index
TLI	0.892	Tucker-Lewis index

Author's Contribution

The author hereby certifies that she is the sole author of the dissertation with the title «Organizing corporate procurement for performance: strategy, organization, and ambidexterity». Theory development, empirical design, data collection, data analysis, and writing were the author's sole responsibility.

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