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Two Studies Analyzing The Effects of Business Case and Paradoxical Cognitive Framing on Sustainability Decision Making

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TWO STUDIES ANALYZING THE EFFECTS OF BUSINESS CASE AND PARADOXICAL COGNITIVE FRAMING ON SUSTAINABILITY DECISION MAKING

by

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ABSTRACT

These two companion studies theoretically and empirically examine managers' use of different cognitive frames in decision-making related to corporate sustainability. Study I is a theoretical undertaking aimed at highlighting potential zones of investigation arising from the introduction of paradox theory into managerial accounting. First, I examine extant literature on paradoxes to garner an understanding of its evolution and application in the management and psychology domains. Second, I use current constructs and typologies to identify multiple sustainability and managerial accounting tensions as paradoxical. Third, I make recommendations on how to apply paradox theory more effectively to the corporate sustainability tensions I identified. I conclude the first paper with research questions pertaining to managerial accounting in corporate sustainability.

Study II is a behavioral experiment. In this study I examine the effects of business case and paradoxical case cognition on managers and seek to uncover which organizational performance measures better support each cognition. Scholars suggest that the tensions in corporate sustainability arise from the complicated and interdependent relationship among its dimensions. and oftentimes progress towards any single dimension, might have unintended consequences on the other dimensions Hence, the empirical question becomes, amid such tensions, how do managers make decisions that are not solely driven by the financial dimension of corporate sustainability? Applying paradox theory, with its emphasis on acknowledging and working through tensions, holds the potential to elucidate how managers can further explore the tensions inherent in management accounting and sustainability. Study II results show that managers operating in a paradoxical case cognition with broad performance measures made more sustainable decisions relative to their counterparts operating in a business case cognition

with narrow performance measures. Together these companion studies generally support the use of paradox theory in studying sustainability decision-making and its use in moving beyond short-term economically focused organizational processes.

I dedicate this dissertation to those who love me and called me Ms. Brown. Mama and Aunty, you have contributed to my past, my present, and my future in ways unimaginable. Thank you!

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INTRODUCTION

Driven in part by stakeholder demands, corporate sustainability has become a buzzword in contemporary management practice and management studies. Organizational leaders identify corporate sustainability as not only an urgent business imperative, but also as one of "the most urgent" and "complex challenges" that their organizations and society face (Unerman & Chapman, 2014, p. 385). Arguably the multidimensionality, interrelatedness and potential contradictions among the dimensions of the corporate sustainability concept, and the dominant business case framing all contribute to the challenges that contemporary managers face in satisfying stakeholder demands to integrate sustainability into management practices and operations.

Like sustainability, paradox theory has recently gained some traction in management research. The tenets of paradox theory revolve around salient interdependent tensions with contradictions that persist across time. Therefore, in this dissertation, I bring together these two concepts; that is, I present paradox theory as an alternative to the business case framing that currently permeates organizational decisions theoretically and empirically.

I accomplish this task in two studies: a theoretical paper and an empirical study. I first develop a shared understanding of paradox theory and its applicability to the concept of corporate sustainability in the accounting domain. Then, I conduct an experiment that applies paradox theory to a supplier selection task.

The theoretical paper synthesizes the existing literature on paradox theory and then interrogate the concept of corporate sustainability via paradoxical lens to identify corporate sustainability paradoxes and uncover a potentially new paradox-corporate sustainability temporal paradox. In this first paper, I also include research questions that can further tests these newly

identified paradoxes. In sum this paper argues that paradox theory and its focus on tensions and potential conflicts, allows us to research corporate sustainability more holistically. That is, paradox theory provides a sufficiently broad scope for us to examine the multidimensional, interconnected and potentially tension-filled and conflicting construct of corporate sustainability.

Managerial cognition and organizational factors in sustainability decisions are important, yet, both are under theorized in accounting and sustainability research (Aguinis & Glavas, 2012). Therefore, in paper II, I employ paradox theory and management control system contextual factors together, to address the following research questions: "What effect do business case and paradoxical thinking have on the sustainability-related decisions of corporate managers?" and 2) "What qualities of performance measurement systems facilitate paradoxical thinking, and, in turn extent to the selection of a more sustainable supplier?"

The results study II reveal that on average, managers operating in the paradoxical cognitive frame and operating under broad performance goals made more sustainable decisions. As predicted, cognitive frame and performance measurement focus have an interactive effect on the purchasing managers' decisions about how much of a company's supply contract to award a sustainable supplier. Specifically, when the managers are operating under the paradoxical cognitive frame and broad performance measurement goals, they awarded the sustainable supplier a higher proportion of available contracts (i.e., they made a more sustainable recommendation) compared to those managers operating under the business case cognition and narrow performance measurement goals.

Taken together, these two studies generally support the use of paradox theory in studying sustainability decision-making. Applying paradox theory to corporate sustainability holds the

potential to help move researchers and practitioners beyond short-term economically focused organizational processes and outcomes.

STUDY ONE: PARADOX THEORY: SYNTHESIS AND RESEARCH OPPORTUNITIES IN MANAGERIAL ACCOUNTING

Introduction

Paradox theory is a fairly well-established theory in management studies, but this is not the case in accounting. The goal of this paper is to review paradox theory and demonstrate its potential usefulness in the study of accounting and corporate sustainability. Contemporary organizational leaders are now accepting that sustainability is one of "the most urgent and complex challenges facing their organizations and society more broadly" (Unerman & Chapman, 2014, p. 385). This realization has directed some organizational leaders to turn to management accounting scholars and professionals to "help identify and manage these sustainability-related" challenges (Unerman & Chapman, 2014, p. 385). One conceivable way to adequately assist organizations and society could be for accounting professionals to develop processes that can more accurately capture the multiple dimensions of sustainability and for scholars to conduct impactful theory-driven accounting research in the area of sustainability. Yet, to date the professional debate concerning how to capture and report sustainability is ongoing; and, research in management accounting and sustainability remains under-theorized (Brown & Dillard, 2015; Soderstrom, Soderstrom, & Stewart, 2017; Unerman & Chapman, 2014).

An examination of Soderstrom et. al's (2017) review of scholarly work at the intersection of corporate sustainability and management accounting reveals the absence of paradox theory in this field. I bridge this gap in literature by proposing a paradox theory lens for researchers and organizational actors wishing to pursue corporate sustainability. Sustainability[1], defined as the

[1] The definitions of sustainability and corporate sustainability remain a contested domain. However, in this project, I tend to rely on definitions of both that have a degree of convergence around the Brundtland (1987) commission

ability of companies to "meet the needs of the present without compromising the ability for future generations to meet their own needs" (Brundtland, 1987, p. 16) is a multidimensional phenomenon. The three most accepted[2] dimensions are economic, social, and environmental (Elkington, 1994), and these dimensions are interrelated and potentially tenuous because each dimension requires resources and attention.

The demand for sustainability can create tension and tension is the building block of paradoxes. Broadly conceived, tensions are the push-pull forces that result from opposing demands or sources of contradictions. These forces usually arise from complex and ambiguous systems (Lewis, 2000; Lewis, Andriopoulos, & Smith, 2014; Smith & Lewis, 2011). Tensions become paradoxical when the tenuous forces exist together, are interrelated and persistent across time (Lewis, 2000; Smith & Lewis, 2011) as is the case with corporate sustainability.

Therefore, the paradoxical lens provide an understanding of the tensions and paradoxes related to developing and implementing sustainability more successfully into organizational structures and operations. The insights drawn from paradox theory also provide fundamental guidelines for how managers can productively work through tensions and aid in the development of viable sustainability-oriented organizations. I acknowledge that there are other theoretical approaches that focus on contradictions and potential tensions between competing elements. However, the paradoxical approach differs from some of those other theoretical approaches primarily through its focus on both the contradictory and interrelated aspects of tensions, and in its proposed approach to "accept" rather than resolve tensions. For instance, institutional logics and it's closely related theory, institutional complexity, primarily "focus on logic

report. For example Dyllick and Hockerts (2002) define corporate sustainability as ''meeting the needs of a corporation's current direct and indirect stakeholders without compromising its ability to meet the needs of future stakeholders as well''(2002, p. 131).

[2] Pencle, N., & Mălăescu, I. (2016) identified more than three distinct categories in CSR.

incompatibilities", but not interdependence, and then "explore the possible approaches to minimize these conflicts" rather than accept them (Smith & Tracey, 2016, p. 458). On the other hand, while "dialectics emphasize contradictory and interrelated elements" that theory focusses on resolution, as the synthesis is formed (Smith & Tracey, 2016).

In focusing on paradox theory, I present a theoretically different starting point for accounting researchers and practitioners working in corporate sustainability. This starting point is based on the premise that the social and environmental dimensions of corporate sustainability deserve attention, regardless of the repercussions for profitability or corporate tensions. This project proposes that a framework of paradoxical cognition can help corporate managers recognize and deal with the complexities of corporate sustainability and its inherent tensions and bring new research insights into the field.

Paradox theory, with its focus on tension and potential conflict, accounts for the multidimensional, interconnected, potentially tension-filled, and conflicting environmental, financial, and social dimensions of corporate sustainability. By advocating for the use of paradox theory in corporate sustainability solutions, I honor Brown's call "for approaches that recognize the plurality [of]… contradictions, tensions and conflicts inherent" in the concept of sustainability (2009, p. 314). I also accommodate Unerman and Chapman's (2014) request for a "more sophisticated use of theory" to help us advance our understanding in this field (p.387).

Finally, drawing on the burgeoning paradox theory research outside of accounting, this research poses specific accounting-related research questions that can be used to advance our understanding of the nuances of corporate sustainability. Broadly conceived, these questions relate to the following inquiry: "In the area of corporate sustainability, what are some of the key

organizational, group, or individual conditions in which the intended benefits of paradoxical cognition may be achieved?"

A key insight from my review and analysis is that paradoxical cognition can aide managers to value the pursuit of corporate sustainability beyond its instrumental link to economic goals. Furthermore, my analysis also shows that accounting researchers interested in sustainability can use this theoretical approach to simultaneously widen the scope and sharpen the focus of topics researched under the corporate sustainability umbrella (Brown & Dillard, 2015; Lewis & Smith, 2014). The paradox theory will allow researchers to explore nuances related to the inherent tensions, interconnectedness, and temporal conflicts present in the simultaneous pursuit of environmental, social and financial sustainability. In sum, paradox theory holds the potential to help managers and researchers to practice and explore corporate sustainability issues in fundamentally different ways.

The remainder of the paper is organized into four sections. Section two, delves deeper into paradox theory; identifies types of paradoxes; provides an overview of the documented defensive and active responses to paradoxes and closes with a discussion on "Vicious and Virtuous Cycles". In section three I apply paradox theory and its related constructs to identify paradoxical tensions in the study and practice of management accounting and corporate sustainability and I also highlight some typical responses to each type of paradox identified. I dedicate sections four and five to developing an alternative approach to responding to each type of paradox identified and proposing a research agenda. The final section offers concluding remarks.

Literature Review

Paradox theory has its roots outside of the business domain, especially in philosophy and psychology, and the concept of paradox can be traced back to ancient cultures. Therefore, to accomplish my research objective of introducing management accountants to this theory I conduct a literature review. In this review, I aim to develop a shared understanding of paradox theory by discussing its foundation, evolution, and typical responses. First, in the subsection entitled "paradox theory" I outline the theory and some of the underlining assumptions that have shaped the psychology and management literature to date. Second, I discuss the types of paradoxes that present themselves at the macro-, meso-, and micro- levels of organizations. The third subsection provides an overview of the documented defensive and active responses to paradoxes. That section also provides a theoretical foundation on which to introduce the managerial accounting and sustainability literatures to the vicious and virtuous response cycles. Finally, under the "vicious and virtuous cycles" heading, I outline in detail the embedded negative and positive effects of using the defensive versus the active responses to paradoxical tensions.

Paradox Theory: Meaning and Evolution

The concept of paradox can be traced back to ancient cultures. Foundational paradox tenets are rooted in both Eastern and Western philosophies; these ancient roots inform how management and business scholars have come to theorize paradoxes (Schad, Lewis, Raisch, & Smith, 2016). The Taoist "yin yang" symbol, which is derived from Eastern societies, is the most common or commercialized depiction of a paradox. Eastern cultures view paradoxes as lenses through which the world may be viewed. Such lenses highlight the existence of opposites in physical and constructed worlds: light/dark, feminine/masculine, death/life (Chen, 2002; Peng &

Nisbett, 1999). These teachings suggest that an individual may experience tensions when placed in seemingly opposing situations, and that these situations and their associated tensions hinder individuals from fully grasping and understanding the "underlying wholeness" of existing situations (Schad et al., 2016, p. 8). Stated differently, the experience of tensions may obscure the interconnectedness of events or situations. In sum, the above scholars suggest that Eastern cultures tend to emphasize embracing and transcending tensions arising from opposites as opposed to resolving them. This idea of embracing paradoxes through paradoxical cognition is later explored in more detail.

In Western societies, the understanding of paradox is derived primarily from Greek philosophy; the word is rooted in the Greek terms *para* (contrary to) and *doxa* (opinion) (Schad et al., 2016). As with Eastern understandings, Western philosophy depicts paradoxes as contradictory yet interrelated, but tends to place more emphasis on the idea of using such contradictions to uncover "truths" (Schad et al., 2016, p. 8). Western philosophers also have a deep interest in the rhetorical paradoxes, which focus on language. A common rhetorical paradox is the liar's paradox. Unlike Eastern philosophers, Westerners' general approach to meaning is to "search for truth within contradiction" (Schad et al., 2016, p. 9) and thereby resolve or solve, as opposed to embrace, paradox (Schad et al., 2016; Sorensen, 2003).

A hybrid of both Eastern and Western philosophical approaches to paradoxes was adopted by dialectical and existential philosophers (Schad et al., 2016, p. 8). For example, Hegel, a well-known dialectic scholar, suggested that there are natural conflicts between thesis and antithesis, yet subscribed to the idea of searching for a synthesis. This synthesis then becomes the new thesis which eventually attracts is own antithesis. According to Hegel, this process of thesis-antithesis-synthesis keeps replicating itself as human beings search for

"greater truths" (Clegg, Cunha, & Cunha, 2002; Schad et al., 2016). Kierkegaard (1954), the father of existentialism, posited that there is a contradiction between the "finite (personal and social norms or restrictions), and the infinite (exploration and uncertainty)" (Schad et al., 2016, p. 9). Human rationality prevents the discovery of greater meaning by prioritizing the former (finite), embedding the finite within formal structures to protect the mind from fear of the infinite. However, Kierkegaard (1954) further suggested that this process only serves to create more awareness of the infinite (Schneider, 1990). In summary, modern philosophers have acknowledged the existence of contradictory elements at play within any search for truth and have either embraced its solvable nature (dialectic scholars) or warned against the detriments of pursuing solutions (existential scholars).

Contemporary paradox theory is rooted in philosophy and psychology but also has been applied to business domains. Contemporary management scholars have adopted various positions in the definition of paradox. Most of these perspectives have been influenced by the works of the management scholars who preceded them. One of the earlier scholars, Cameron (1986), defined a paradox as consisting of "contradictory, mutually exclusive elements that are present and operate at the same time" (p. 545). Noteworthy is the reference to the mutually exclusive nature of paradoxes. Poole and Van de Ven (1989) described paradoxes from a more theoretical perspective, referring to them as "interesting tensions, oppositions, and contradictions between theories which create conceptual difficulties" (p. 564). Other scholars in management defined paradoxes as contradictions but provided specificity as to where the contradictions can be found within organizational practices (e.g., Eisenhardt & Westcott, 1988), explicit statements (e.g., Murnighan & Conlon, 1991), or human emotions (e.g., Vince & Broussine, 1996).

More recently, prominent management scholars Smith and Lewis (2011) departed from their fellow scholars and defined a paradox more broadly as "contradictory yet interrelated elements that exist simultaneously and persist over time" (p. 382). This definition has gained traction as the work of these academics and their colleagues continue to advance the use of paradoxes in management research. Similarly, Schad et al. (2106) defined a paradox as a "persistent contradiction between interdependent elements" (p. 10). These definitions embrace both Eastern and Western philosophies on the contradictory and persistent nature of paradoxes. While Cameron (1986) conceptualized paradoxes as mutually exclusive, Smith and Lewis (2011) as well as Schad et al. (2016) suggested that paradoxes are interrelated and exist together. Poole and Van de Ven's (1989) definition of paradoxes appeared to be silent on the issue. My research aligns with the scholarly works of Smith and Lewis (2011) as well as Schad et al. (2016). Notably missing from the definitions above are ideas about how to deal with paradoxes. Once a paradox has been identified and defined, how practitioners and scholars approach the paradox tends to differ. Once I have defined the types of paradoxes, a subsequent section entitled "Responses to Paradoxes" elaborates on the most common approaches to resolving or embracing paradoxes.

Types of Paradoxes

Extant literature provides four major categories of paradoxes: organizing, performing, belonging and learning as outlined in Table 1. I will now look at each of these paradoxes and discuss key studies that provide a deeper understanding of paradox theory.

The paradox of *organizing*, as identified by Lewis (2000), highlights the need for both stability and change at the organizational level. Organizations may be considered "social spaces continuously torn by members in multiple and contradictory directions" (Bouchikhi, 1998, p.

224). This definition of an organization lends itself to the core principles of the organizing paradox, as it highlights the idea of an organization being comprised of multiple, possibly contradictory parts that are still a part of the whole. That is, within an organization, each part needs to function not only as its own sub-unit but also as a part of the greater organizational structure. The paradoxical tensions resulting from this process of organizing have been labeled differentiation and integration (Lawrence & Lorsch, 1967). Other organizing paradoxical tensions include empowerment and control (Clegg et al., 2002; Lüscher & Lewis, 2008; Smith & Lewis, 2011) and exploration and exploitation (Andriopoulos & Lewis, 2009; Smith & Tushman, 2005). Lewis (2000) recommended that "using the paradox framework, in future studies researchers can explore organizing as an ongoing process of equilibrating opposing forces and detail its tensions, cyclical dynamics, and management" (p. 769).

Performing paradoxes surface primarily at the micro-level as individuals are called upon to perform multiple and often inconsistent roles to fulfill their obligations to an organization (Jarzabkowski, Lê, & Van de Ven, 2013; Lüscher & Lewis, 2008). Jarzabkowski et al. (2013) suggested that individuals not only experience paradoxical tension as they try to respond to conflicting demands present in their own roles, but they also experience struggles in responding to "conflicting demands arising from the roles of others with whom they share joint tasks" (p.247). Multifaceted organizational goals and differentiated structural units are two of the major factors theorized to give rise to performing paradoxes (Denis, Langley, & Rouleau, 2007; Jarzabkowski & Fenton, 2006; Smith & Lewis, 2011). In their qualitative study of the Lego company during an intense period of organizational change, Lüscher and Lewis (2008) found that performing paradoxes manifested as the "managers' roles morphed, blurred, and multiplied" (p. 230). The managers in that study were faced with being in charge of newly formed self-

maintained teams and struggled with how they could "be in charge and let others make the decisions" as well as how they could "focus on building … teams, when there is such intense pressure to increase production"(Lüscher & Lewis, 2008, p. 230).

Lewis (2000) and Smith and Berg (1987) are credited with early work on the *belonging* paradox. These scholars, along with Lüscher and Lewis (2008) characterized belonging paradoxes as tensions between oneself and others, especially others within one's immediate referent group. The belonging paradox usually happens at the meso-level and specifically involves tensions between the individual's values and beliefs and those of people in their referent group and the wider organization (Jarzabkowski et al., 2013; Lewis, 2000; Lüscher & Lewis, 2008). Lewis (2000) defines the belonging paradox simply as the "tenuous and often seemingly absurd nature of membership" (p. 769).

The fourth major type of paradox is the paradox of learning. According to Lewis (2000) the learning paradox revolves "around processes of sensemaking, innovation, and transformation that reveal interwoven tensions between old and new. Furthermore, Lewis (2000) and Smith and Lewis (2011) argued that the learning paradox arises from tensions that occur when past structures are simultaneously built upon and torn down in order to advance learning. Jarzabkowski et al. (2013) posited that the true learning paradox is more than switching between old and new forms of knowledge and learning; it "involves an innate tension between specific modes of knowing and knowledge acquisition" (p. 248). The learning paradox is a "multilevel construct" that presents itself at macro-, meso-, and micro- levels of organizations (Jarzabkowski et al., 2013, p.248).

Responses to Paradoxes

Salient paradoxical tensions require a response since at their core, paradoxical tensions are interrelated, persistent and competing demands for resources (Smith & Lewis, 2011). In fact, Putnam, Fairhurst, and Banghart (2016) suggest that it is the salient paradoxical tensions that organizational actors "see, feel, cognitively process, and even communicate about as they experience them"(2016, p. 68). Once paradoxical tensions surface or materialize at some level, whether at the organizational (macro), group (meso), or individual (micro) level, such tensions necessitate a response because of their potentially disruptive nature (Lewis, 2000; Smith & Lewis, 2011). Therefore, the responses to paradoxes may also arise at the macro-, meso-, and micro-levels.

Scholars have categorized responses to paradoxes into *defensive and active responses* (Jarzabkowski et al., 2013; Lewis, 2000; Smith & Lewis, 2011). As depicted in Table 2, the typical responses to paradoxes are categorized based on the organizational actors' level of engagement or avoidance of the underlining tensions inherent in the paradox. That is, the level of tension avoidance creates the delineating line along which scholars categorize typical responses to paradoxes. See Table 2 for a list of the most commonly documented responses to paradoxes found in management and psychology literatures.

Defensive responses may be viewed as quick fixes that provide relatively short-term relief from paradoxical tensions, but do not necessarily provide a way to "work within or understand paradox" (Jarzabkowski et al., 2013, p. 249). Documented examples of defensive responses to paradoxes include *splitting* (Lewis, 2000; Poole & Van de Ven, 1989); r*egression and repression* (Kraatz & Block, 2008; Lewis, 2000); *projection*, *reaction formation*, and *ambivalence* (Lewis, 2000).

Splitting entails separating or compartmentalizing paradoxical elements to prevent interaction which may then cause tensions to arise (Andriopoulos & Lewis, 2009). Within an organization, splitting may be structural: it may be accomplished by separating divisions or hierarchical levels. Splitting can also be of a temporal nature, with different paradoxical goals being prioritized at different points in time (Tushman & Romanelli, 1985; Poole & Van de Ven, 1989). In some streams of management literature, the splitting approach is aligned with contingency theory (Lewis & Smith, 2014).

Rosenbloom and Christensen (1994) illustrated splitting exploration-exploitation tensions by location. Tushman and Romanelli (1985) documented cases where these tensions were resolved by structural and temporal separation. The authors propose a punctuated equilibrium that focuses primarily on one tension, either stability or change, at a time. In a more recent work, the managers in Jarzabkowski et. al's (2013) case study exemplified the splitting response more spatially by compartmentalizing the paradoxical tensions present during the company's period of restructuring. The telecommunications company managers who Jarzabkowski and colleagues studied employed splitting by "interpreting goals as separate, establishing independent divisional identities, working within divisional boundaries toward own goals, and developing separate procedures for each division" (p. 256). The various forms of splitting separate paradoxical forces and aim to prevent potential interaction among these elements, and, that process according to Jarzabkowski et al. (2013) makes the splitting response the "least conflictual" (p. 248) of all the defensive responses.

On the other end of the spectrum, *reaction formation* is the "most conflictual" defensive response to paradoxes (Jarzabkowski et al., 2013, p. 249). Responses of this nature seek extreme alignment with one side of the paradox. Such alignment may result in opposition to the

other side and extreme polarization of issues (Lewis, 2000, Jarzabkowski et al., 2013). The reaction formation response usually occurs when managers are unwilling to compromise (Lüscher & Lewis, 2008; Smith & Berg, 1987). The lack of compromise may result in spiraling conflict and vicious cycles (Bateson, 1972; Smith & Lewis, 2011; Werner & Baxter, 1994). Sundaramurthy and Lewis (2003) offered an example of reaction formation in their examination of push-pull tensions present between collaboration and control in organizational governance. The authors propose that boards and executive teams that choose to align with collaboration were willing to "exert energy defending their current course of action, thereby suppressing the need for greater monitoring, discipline, and control" (Sundaramurthy & Lewis, 2003, p. 403).

The *ambivalence* response entails a degree of compromise by using "lukewarm" responses that "lose the vitality of extremes" involved in the paradox (Lewis, 2000, p. 763). According to Larson and Tompkins (2005) the managers they studied at JAR Technologies, an aerospace company, expressed high levels of ambivalence during the company's period of repositioning. At the time of the authors' study, JAR Technologies was moving away from a technical culture to a more cost/schedule culture. The managers, who were primarily engineers, responded to the belonging tensions triggered at the macro-level by "subtly undermin[ing] their own change efforts" in their conversations with subordinates (p.11). Murnighan and Conlon (1991) used observation and the explicit statements of British string quartets to provide us with another example of the ambivalence response to paradoxical tensions experienced at the meso-level among members of the group. Murnighan and Conlon (1991) noticed that when tensions would arise during rehearsals some band members would quickly agree to weak compromises that they later revealed they did not embrace. However, such ambivalence helped to temporarily

mute the tensions. Each example demonstrates an ambivalent reaction aimed at avoiding the immediate feelings of tensions.

The *projection* response to paradoxical tensions is defined as the "the transfer of conflicting attributes or feelings, often onto a scapegoat or repository of bad feelings" (Lewis, 2000, p. 763). Studies in management document projection both at the meso- and micro-levels of the organization. For example, during their ethnographic work, Ashforth and Reingen (2014) documented a combination of separation and projection responses to paradoxical tensions present at the meso-level of a natural food co-operative that espoused both idealistic co-operative and pragmatic financial goals. Ashforth and Reingen (2014) evaluate the organization as a hybrid attempting to find their optimal combination of cooperative process and capitalist production. According to the researchers, the members of the co-op split their inter and intra group tensions along the fault lines provided by the institution's guiding documents: idealistic vs. pragmatist. Then, the members projected the undesirable part of the ongoing tension onto their fellow co-operative members, often during disagreements regarding policies and practices. Similarly, the less successful quartets musicians in Murnighan and Conlon's (1991) study also projected their own frustrations onto other quartet members via personal attacks on other band members. Murnighan and Conlon (1991) also categorize the less successful band members' blaming of more successful band members, for poor performance, as a form of projection. These examples demonstrate that when paradoxical tensions exist, the blaming action transfers the frustrations of one member to another member without addressing the tensions and is thus considered projection.

The *repression* response involves ignoring, blocking, or denying the tensions that give rise to the paradox (Lewis, 2000; Putnam et al., 2016). The *regression* response involves

"resorting to understandings or actions that have provided security in the past" (Lewis, 2000, p. 763). According to Klein (1994), managers who were a part of the Total Quality Management (TQM) movement responded with repression during the implementation of the system. Klein (1994) suggested that TQM produced tensions between commitment and control because of the ways it combined participatory management practices with the standardization of work procedures. However, the managers chose to only focus on the empowering control benefits of the system. Therefore, the managers in Klein's (1994) study exemplified the repression response to paradox by downplaying the tensions between employee commitment and autonomy while emphasizing the employee empowerment benefits of the TQM system.

In general, defensive responses to paradoxes employ some method of avoidance. These responses provide a "false appearance of order" (Lewis, 2000, p. 763) that help individuals cope with paradoxes and avoid potentially tenuous situations. However, since defensive responses do not address the underlying tensions associated with the specific paradoxes, the paradoxical tensions will tend to resurface when these avoidance options are undertaken. Lewis (2000) cautioned that defensive strategies could limit individual learning and potentially lead to "organizational paralysis or decline at worst" (p. 766) since such responses can mask the individual's recognition of potentially obsolete skills and routines.

Juxtaposed to the defensive responses are *active* responses. Table 2 provides a list of the most common active responses. This category of responses includes *acceptance, confrontation,* and *transcendence* (Lewis, 2000; Smith & Lewis, 2011). Active responses are posited to recognize paradoxical tensions and then go beyond quick fixes and generally seek to address the underlying paradoxical tensions. Lewis (2000) and Smith and Lewis (2011) suggest that these

active responses may be used in insolation or in combination at various levels within an organization.

As a possible starting point for all active responses (Smith & Lewis, 2011), *acceptance* entails acknowledging and "learning to live with [the] paradox" (Lewis, 2000, p. 764). Poole and Van de Ven (1989) as well as Sundaramurthy and Lewis (2003) viewed acceptance as an attempt to balance paradoxical elements. The acceptance response requires that individuals consciously find ways to balance the paradoxical elements. For example, the quartet musicians in Murnighan and Conlon's (1991) study recognized the tensions present in their simultaneous desire for personal and group leadership, but chose to "play through" those tensions. In another example, the managers Luscher and Lewis (2008) studied were experiencing multiple inconsistent signals related to organizational processes and practices as the Lego Company undertook restructuring efforts. Yet, according to Luscher and Lewis (2008) those managers and the productions teams they lead decided to accept "inconsistencies, conflict, and ambiguity as natural working conditions" (p.234). As an active response, acceptance lays the foundation for other responses by acknowledging the existence of paradoxical tensions.

The *confrontation* response involves "directly addressing and working through the sources of tension" (Jarzabkowski, Lê, & Van de Ven, 2013, p. 249); Engeström and Sannino (2011), Lewis (2000), Lindblom (1965), Lüscher and Lewis (2008), and Poole and Van de Ven (1989) all view confrontation as the most direct approach: it tackles paradoxical elements head-on by addressing and attacking the source of the paradox. A classic example of confronting paradoxical tensions was exhibited by the participants in Lusher and Lewis' (2008) study. The researchers acted as facilitators and allowed the managers and their subordinates to openly discuss the tensions they were experiencing. As an active response, confrontation seeks to

manage paradoxes "via open communication in order to achieve acceptance" (Jarzabkowski, Lê, & Van de Ven, 2013, p. 254)

The final active response, *transcendence*, involves accepting paradoxical tensions as interrelated and persistent (Andriopoulos & Lewis, 2009; Lüscher & Lewis, 2008; Smith & Lewis, 2011). Jarzabkowski et al. (2013) defined this active response as a higher order response that can be accomplished by reframing the paradox (Seo et al., 2004; Werner & Baxter, 1994); encouraging pluralistic views as equally valid (Kraatz & Block, 2008; Miron-Spektor et al., 2011); or by employing paradoxical leadership and thinking (Lewis, 2000; Smith & Lewis, 2011; Smith & Tushman, 2005; Sundaramurthy & Lewis, 2003). Stated differently, transcendence entails dramatic changes in logic and behaviors with the objective of constructing a more "complicated repertoire of understandings" related to paradoxical tensions. That is, an understanding that enables an "accommodating perception of opposites" and ultimately internalizes the view that paradoxical tensions are "complementary and interwoven" (Lewis, 2000, p. 764).

Abdallah et al. (2011) cautioned against becoming complacent or harboring false hope concerning the permanence of results from active approaches to paradoxes; by their definition and nature, paradoxes are fundamental to humans and organizations, and thus require continuous attention. Similarly, caution can also be exercised regarding the strict delineation of the two distinct categorical responses to paradoxes, since it could be argued that a defensive response could become a sensitizing mechanism that could then lead to a more active response. For example, in Lüscher and Lewis' (2008) action research, managers at the Lego Company responded to the period of organizational change via defensive response of splitting or separating performing tensions as the ultimate response. Yet, the managers soon realized that

this approach was suboptimal. Then later, through a series of sparring sessions and intervention, the authors themselves, Lüscher and Lewis's (2008), also applied splitting, but only as an intermediate step towards acceptance, an active response. Therefore, a defensive response may help to facilitate an active response since initially separating the tensions temporally and spatially, helped to "generate a meaning that could accommodate contradictions" (Lüscher & Lewis, 2008, p. 232).

Responses to paradoxes may be analyzed at macro-, meso-, and micro- levels. Lüscher and Lewis (2008) consistently found that in their sample firms, the paradox of organizing was consistently associated with the acceptance coping strategy, the paradox of belonging was consistently associated with confrontation coping strategy, and the paradox of performing was associated with the splitting coping strategy. While these associations are common, care should be taken not to ascribe a one-to-one pairing of the type of paradox to the type of response. This caution is given in light of the fact that a response to a paradox can vary based on a variety of situational factors. Both the Lüscher and Lewis (2008) and Poole and Van de Ven (1989) studies suggested that an organization, team, or individual may experience a combination of responses over time. Additionally, Smith and Lewis's (2011) dynamic equilibrium model recommended a strategy for managing paradoxes which involves a combination of both defensive and active responses. These authors suggested that in the short-term, organizations, teams, and individuals attempt to find synergies between competing demands and/or provide oscillating support between elements, but in the long term accept paradoxical tensions (Smith & Lewis, 2011).

Vicious and Virtuous Cycles

Jarzabkowski et al. (2013) suggest that embedding defensive or active responses to paradoxes at the macro-, meso- and micro-levels of an organization has the potential to "fuel [the] next cycle of response to paradox" (p. 265). There are two documented "reinforcing cycles" that result from defensive or active responses to paradoxes: the "vicious" and the "virtuous" cycles (Smith & Lewis, 2011, p. 391). Following the current literature [3]on paradox theory, I summarize these two reinforcing cycles below as directly resulting from repeated engagement with either the defensive or active responses described earlier.

Theorized as "negative," the vicious cycle augments the defensive responses to paradoxes and does little to address paradoxical tensions (Smith & Lewis, 2011). Routinely responding to paradoxical tensions using defensive tactics such as splitting, regression, repression, projection, reaction formation, or ambivalence may be quick fixes that lead to temporary relief of tensions. When defensive patterns of behavior are reinforced, then the tensions underlining the paradox are ignored in favor of an immediate resolution. This resolution usually takes the form of an either/or choice (Smith & Lewis, 2011). However, over time, the unaddressed tensions and the options "not" given attention tend to resurface, and, once more, demand attention. Addressing these renewed tensions with more defensive actions leads to the embedding of the defensive response, thus giving rise to the vicious cycle and its negative effects (Jarzabkowski et al., 2013; Lewis, 2000; Smith & Lewis, 2011). For example, Sundaramurthy and Lewis (2003) highlight vicious cycles in their examination of collaboration–control tensions in governance. Boards and

[3] Notwithstanding my decision to use the distinct categories for vicious and virtuous cycles, I question the parameters that defines such categorizations. I submit that a mix of defensive and active responses may lead to reinforcing cycle that is may not currently fit into either a cycle. Furthermore, under what circumstances, if any, can defensive responses lead to a virtuous cycle? For example, it is not clear how one would categorize an approach described in Cho et al. (2015) as "organized hypocrisy".

executive teams that repeatedly overemphasizes either collaboration or control; this defensive response then exacerbated the tensions and caused other boards and executives to cling more tightly to the opposite poles. This more forceful clinging then fuelled further defensiveness and resulted in a downward spiral and declining organizational performance.

The vicious cycle does not result in any progress toward accepting the paradox. Rather, the vicious cycle is recursive and even has the potential to perpetuate and unnecessarily exacerbate paradoxical tensions (Lewis, 2000). Scholars suggest that the vicious cycle stems from an individual's need for consistency, both cognitively and behaviourally, and the desire to avoid emotional anxiety. At the organizational level, vicious cycles are reinforced through resistance to change and general organizational inertia (Smith & Lewis, 2011).

The virtuous cycle is theorized as "positive" and stands in stark contrast to the vicious cycle: it embodies the cumulative effects of active responses to paradoxes. Active responses emanate from the premise that multiple and contradictory elements can be valid (Jarzabkowski et al., 2013). Typically, these active responses to paradoxical tensions include acceptance, confrontation and transcendence.

Embedding active responses to paradox lead to the more desirable virtuous cycle, which acknowledges that paradoxical tensions are a "natural condition of work" (Jarzabkowski et al., 2013, p. 249). This perspective does not force organizational actors to choose between contradictory elements, but rather provides the setting for these actors to "consider both/and possibilities" (Smith & Lewis, 2011, p. 391). Thus, embedding the virtuous cycle in organizations via recursive active responses provides the ongoing opportunity for organizational actors to work within paradoxes and does not try to "resolve or prevent the experience of paradox" (Jarzabkowski et al., 2013, p. 268). Scholars have suggested that at the individual level,

the main factors that spur the virtuous response to paradoxes are "cognitive and behavioral complexity, [and] emotional equanimity", while "dynamic capabilities" are foster the virtuous cycle at the organizational level (Smith & Lewis, 2011, p. 389).

In summary, the vicious and the virtuous cycles represent cumulative patterns of defensive (negative) and active (positive) responses to paradoxical tensions. Prior literature has suggested that embedding either the defensive or active responses to paradoxes has the potential to fuel recursive cycles. On one hand, the consistent use of defensive responses to avoid paradoxical tensions can lead to the vicious cycle. On the other hand, the consistent use of active responses to work through paradoxical tensions can lead to the virtuous cycle.

Synthesis of Current Corporate Sustainability Research

Collectively, the foundational information provided thus far allows me to now apply paradox theory, in a theoretically informed manner, to the management accounting space and more specifically to the management accounting aspects of corporate sustainability. My analysis of prominent literature at the intersection of accounting and sustainability highlight the lack of the paradoxical theory to motivate those studies. Therefore, I move forward in this section by focusing on the areas of management accounting that exhibit paradoxical characteristics. Following that discussion, I identify and characterise tensions that are unique to the management of corporate sustainability as either of the four types of paradoxes I outlined above. The deductive and inductive processes used led me to uncover what I call the "temporal paradox of corporate sustainability"; which I introduce at the end of this section.

Paradoxical Tensions in Corporate Sustainability

Paradox theory argues that organizations are complex and the pursue multiple goals that are related to the expectations of stakeholders making multiple demands (Smith & Lewis, 2014). The concept of corporate sustainability is rooted in the pursuit of multiple goals at societal, organizational and individual levels. Organizations are "inherently paradoxical" (Jarzabkowski et al., 2013, p. 245) due to their embedded complex systems that are formed to help achieve these goals. The complexities and tensions present within an organization simultaneously pursuing social, financial, and environmental objectives, whether constructed or inherent, make them a useful choice through which to apply the paradox perspective to corporate sustainability in management accounting.

Organizing Tensions in Corporate Sustainability

Organizations striving for corporate sustainability can become entangled in interconnected and ongoing tensions as they endeavor to pursue benefits beyond economic returns for shareholders. The framers of an organization's responses to these tensions can fundamentally determine the organization's "resilience amid the turbulent and unstable macro-societal environments in which they exist" (Audebrand, 2017, p. 374). The following section focuses on four types of paradoxes (organizing, performing, belonging and learning) that can affect an organization seeking to accomplish corporate sustainability goals beyond those directly linked to financial returns. It also identifies the current typical responses to each type of tension.

As conceptualized in Figure 1, corporate sustainability has at its core the initial, ongoing, and most fundamental tension: organizing tension. Organizing tension is rooted in the fact that free agents come together to "organize," or form structures, and then develop processes and leadership protocols to which these free agents then subject their actions. The result is a

"fundamental tension between the organizational structures that shape actions and the actions through which organizational structures are constructed" (Jarzabkowski et al., 2013, p. 247). Within the management literature, these tensions manifest themselves as systemic contradictions (Benson, 1977; Clegg et al., 2002; Cyert & March, 1963). Traditionally, these contradictions are studied as tensions between empowerment and control (Clegg et al., 2002; Lüscher & Lewis, 2008; Smith & Lewis, 2011) or between exploration and exploitation (Andriopoulos & Lewis, 2009; Smith & Tushman, 2005).

Audebrand (2017) suggested that there are "inherent structural tension[s]" (p. 369) in organizations pursuing social mission and business ventures. Some of these tensions need the others to "sustain" their presence in the organization. As described by Audebrand (2017), these structural tensions are paradoxical and extend to the processes and leadership of organizations with a sustainability focus. The paradox of organizing within the corporate sustainability context specifically addresses questions related to structure, processes, and leadership. These questions include: How should we organize to focus on sustainable goals? What systems or processes should we adopt to meet sustainable objectives? Who should be in control as we pursue corporate sustainability? For corporate sustainability within the managerial context, the organizing paradox is exemplified as tensions surrounding the organization's control systems. Organizational actors are faced with complex management control systems (MCS) that create competing structural designs, varying levels of control and integration, and reinforcing processes structured to achieve different levels of sustainable corporate outcomes.

The design and implementation of a control system within a sustainably-oriented organization is further complicated due to these sustainability goals. Scholars have long noted the "complex two-way relationship between [traditional] management control and strategy"

(Crutze & Herzig, 2013, p. 169) and indeed, this relationship is now no less complicated by the addition of sustainability control systems (SCS). Sustainability goals add complexity to MCSs for management accountants.

Furthermore, MCSs traditionally helped organizational leaders align organizational and behavioral structures with the "economic goals of organizations and to assist in improving economic performance" and therefore, may not be equipped to incorporate "the interests of a broad range of stakeholders other than shareholders and in addressing environmental and social issues" (Gond, Grubnic, Herzig, & Moon, 2012, p. 208). The limitations of traditional MCS have been observed by other scholars, and the need for SCS has been raised in multiple works over the last 15 years (Bonacch & Rinaldi, 2007; Burritt & Schaltegger, 2010; Durden, 2008; Gond et al., 2012; Herzig, Viere, Schaltegger, & Burritt, 2012; Norris & O'Dwyer, 2004). This conflict among the MCS and SCS is evidence of the organizing paradox within corporate sustainability.

Another source of paradoxical tensions unique to sustainability relates to the level of integration between MCS and SCS. Gond et al. (2012) sought to provide typologies and clarify the relationship between MCS and SCS and their relation to strategy. Gond et al. (2012) suggested that ideally, there should be a high level of integration between SCS and traditional MCS and a tight coupling of these systems with organizational strategy. Other scholars, such as Porter and Kramer (2006) and Crutze and Herzig (2013), have also suggested that SCS be fully integrated into traditional MCS. In fact, conventional wisdom suggests that more integration of environmental and social issues into traditional MCS would better support strategic integration of sustainability throughout an organization (Crutze & Herzig, 2013). More recently, however, Hahn, Figge, Pinkse, and Preuss (2017) questioned the benefits of fully integrating MCS and SCS systems and strategies.

Typical Reponses to Organizing Tensions

The dominant paradigm for most organizations is a financial one, even in organizations seeking corporate sustainability. Ditillo and Lisi (2016) studied the implementation of SCS across multiple organizations and concluded that the integration of the SCSs was "constrained by existing [organizational] structures and processes"(p. 143). These organizational structures are configured to prioritize the financial implications of addressing social and environmental concerns (Gao & Bansal, 2013). Separating the tensions caused by questions of sustainability is an example of the splitting defensive response (Lewis & Smith, 2014; Smith & Lewis, 2011). This response could take the form of separating the SCS and MCS completely or separating the dimensions of the sustainability construct so as to prioritize the financial and only "reinforce their distinctiveness" (Lewis & Smith, 2014, p. 124) at the expense of their wholeness. Splitting then leads to reaction formation: in this case, organizing control processes and structures around the financial dimension of corporate sustainability.

Prioritizing the traditional MCS or trying to fully integrate SCS into existing MCS is a defensive response to organizing tension because it does not address the tensions. More specifically, I view this action as regression. In paradox theory, regression is typified by resorting to understandings of processes and procedures that were used before (Jarzabkowski et al., 2013; Lewis & Smith, 2014; W. Smith & Lewis, 2011). The objective of the regression response is to avoid the tensions by returning to a pre-tension state (Lewis & Smith, 2014). Contextually, this response to the sustainability paradox of organizing would equate to attempts to return the organization to a period when the sustainability demands were not salient.

Performing Tensions in Corporate Sustainability

The performing paradox is usually visible at the micro-level when individuals are required to perform multiple functions to fulfill their obligations to their organization (Jarzabkowski et al., 2013; Lüscher & Lewis, 2008). Within corporate sustainability, performing tension arises for individuals when an organization acknowledges stakeholders' varying demands on the organization. These multiple demands are often reflected in the way the organization measures and reports performance at strategic and operational levels. Accounting measures form the basis of performance measurement and reporting, and performance measurement systems are the purview of the management accountant (Speziale & Klovienė, 2014). Therefore the management accountants' performing tensions in corporate sustainability relate to managing performance and achieving multiple goals across the dimensions of sustainability.

Beyond reporting on sustainable activities, management accountants are also "business partners" (Goretzki & Messner, 2018; Horton & Wanderley, 2018) and thus are a part of the "strategic, visionary and creative" teams responsible for "decision-making with the organization's management body" (Speziale & Klovienė, 2014, p. 636). In decision-making roles, some of the questions addressed by management accountants include: How can performance measurement systems (PMS) help to effectively capture and report sustainability? Which performance indicators should be used? What, if any, weight should be applied to the selected indicators? In response to these and other questions, some of the tension-filled issues for management accountants in corporate sustainability settings relate to the measurement of financial, social, and environmental goals. In general, an individual's performance on financial goals are easier to measure due to their quantitative nature, whereas their performance on more subjective social and environmental goals are more difficult to measure.

Typical Responses to Performing Tensions

In response to performing tensions, usually "managers seek immediate financial gains from their social and environmental investments, rather than embracing the tension among the economic, social and environmental elements"(Gao & Bansal, 2013, p. 241). These short-term financial gains are usually directly linked to performance measures produced by the management accountant using control systems. The control systems generally use instrumental rationality calculations to measure success—usually in short-term and narrow financial measures such as return on investments (ROI), return on assets (ROA), and earnings per share (EPS). These performance measures are also used by organizations focusing on sustainable investments. This view is shared by Hahn and Figge (2011) as they suggest that "corporate sustainability to date does not measure up… it systematically subordinates environmental and social issues under economic outcomes as it is still rooted in the conventional notion of corporate profitability and bounded instrumentality" (p. 326).

In practicing this bounded instrumentality, organizations and their actors primarily employ either a win-win or trade-off approach to sustainability (Van der Byl & Slawinski, 2015). Those employing win-win strategies will only measure and reward sustainable actions that yield positive financial results, while those employing trade-offs will occasionally accept and reward performance that yields small financial losses to achieve some level of corporate sustainability (Van der Byl & Slawinski, 2015). These performance-related responses undermine the performing paradox in corporate sustainability by subordinating the social and environmental dimensions to the financial through the use of financially oriented performance measures. In the context of the performing paradox in corporate sustainability, this prioritization of financial measures is categorized as reaction formation. This excessive alignment with any one pole of the

paradox (financial dimension) is the most conflictual of the responses and often leads to more "spiraling conflict and vicious" cycles (Jarzabkowski et al., 2013, p. 249).

Evidence of the ambivalent reaction to the performing paradox in corporate sustainability. In the management and psychology literature, the ambivalent reaction is characterized by a "lukewarm" reaction to paradoxical tensions. In corporate sustainability, lukewarm reactions are exemplified by "balancing" performance measures: assigning equal weight to performance measures in the three dimensions of corporate sustainability. In the sustainability literature, this response is known as the integrative approach and seeks to combat the heavy focus on financial measures (Van der Byl & Slawinski, 2015). The integrative response avoids tensions by treating each measure equally. While this response is considered less conflictual, it is also posited to ultimately lead to vicious cycles in corporate sustainability.

Belonging Tensions in Corporate Sustainability

Lüscher and Lewis (2008) suggest that the ongoing tensions between ones' identity and the various roles they fulfill constitutes the belonging tensions. Research documents that management accountants struggle with the issue of work identity and role conflicts (Daoust & Malsch, 2019; Foreman & Whetten, 2002; Gendron & Spira, 2010; Haynes, 2008; Keating & Jablonsky, 1991). Beyond documenting its existence, scholars also have studied the effects of identity and role conflicts at individual, group, and organizational levels. Based on a review of the extant literature focusing on management accounting and identity, Horton and Wanderley (2018) concluded that role and identity conflicts may have "detrimental effects … on both individuals and organizations" (p. 42).

While traditionally the management accountant's role was that of "bean-counter," their role has recently evolved into that of "business partner" (Horton & Wanderley, 2018). Each of

these roles has different sets of expectations related to management accountants' levels of involvement in business operations and decision-making. In their scorekeeping, policing, and reporting role as a "bean-counter," management accountants are expected to be "impartial and independent monitors of fiscal performance, with a particular emphasis on cost-control" (Hopper, 1980). In contrast, in their value creation and business improvement role as a "business partner," management accountants are expected to be more involved and less independent.

The shift in the management accountant's role to that of business partner has been shown to add uncertainty and ambiguity tensions within the organization (Goretzki & Messner, 2018; Horton & Wanderley, 2018). At the group, or meso, level, management accountants, as business partners, are often compared to the operations managers. Internally, that relationship is "not naturally peaceful, stable and easy-going" (Morales & Lambert; 2013, p. 230). At the organizational level, management accountants face role uncertainties, which confronts them "with new, unclear or even conflicting meanings and expectations regarding their skills and tasks" (Goretzki & Messner, 2018, p. 17). Furthermore, there are unresolved tensions surrounding organizational success for an accountant-as-business partner. In fact, Goretzki and Messner (2018) acknowledged that the management accountant's perceived success or failure at "establishing a business partner identity is predominantly in the relationship to operational managers" (p. 2).

The two types of management accountant roles are intensified by the addition of sustainability reporting and disclosure job functions. However, feelings of conflict are expected to be more prevalent in their business partner role. Deciding which sustainability measures to include and which reporting formats to adopt can create potentially irreconcilable tensions. Furthermore, producing sustainability reports that satisfy all stakeholders continues to pose a

problem for management accountants (Gray, 2019). These unsettled sustainability-related issues fuel the paradox of belonging in the sustainability context. Gray (2019) concluded that pursuing corporate sustainability beyond the financial dimension "can challenge an individual's sense of self" (identity) and "their place in society" (role); and can "instil[l] sensations of hopelessness and futility" (p. 40). Gray (2019) proposed that fully understanding corporate sustainability and the individual's role in that process would keep us all from "sleeping at night" (p. 48).

These multiple roles and identities are not discrete constructs; they appear simultaneously and influence one another. Management accountants often face conflicting demands for independence and involvement, often at the same time. Lambert and Sponem (2012) referred to management accountants in their roles as wearing two hats "at the same time, one requiring a degree of involvement with affiliated management and the other a degree of independence from the same" (p. 568). Since management accountants' varying roles can be conflictual, Lambert and Sponem (2012) questioned whether management accountants could wear both hats "effectively" (p. 568).

Belonging paradoxes in the form of role or identity conflicts are undesirable (Carollo & Guerci, 2018; Goretzki & Messner, 2018; Horton & Wanderley, 2018). As outlined previously, in corporate sustainability and accounting, the belonging paradox presents itself as persistent tensions between the various roles and identities that the management accountant faces. An identity conflict occurs whenever the "values, beliefs, norms and demands" (Ashforth & Mael, 1989, p. 29) associated with (or claimed by) one identity conflict with those of another identity. The extant literature suggests that there are often "detrimental, effects of identity conflicts on both individuals and organizations (Fiol et al., 2009; Golden-Biddle & Rao, 1997; Voss et al., 2006).

Typical Responses to Belonging Tensions

The dominant Western goal is for the unified self to be reconciled to the organization's expectations of their roles (Carollo & Guerci, 2018; Goretzki & Messner, 2018; Horton & Wanderley, 2018). The concept of the unified self is the predominant paradigm in academic research on role and identity (Beech, Gilmore, Hibbert, & Ybema, 2016; Carollo & Guerci, 2018; Hartman, 2015). As such, much of the academic currency in the area of identity has been dedicated to "solving" or "resolving" the "problem" of conflicts present in an individual's construction of self. This resolution-oriented process is aimed at producing a sense of "coherence" to help secure identity claims (Alvesson & Willmott, 2002, p.626). Brown's (2015) work suggested that "identity work is undertaken in pursuit of coherent identities" (p. 27). In this view, those struggling with identity issues are conceived of as working toward firmer identity positioning (Beech, Gilmore, Hibbert, & Ybema, 2016). A person moves toward a unified sense of identity by making "certain sets of actions look more natural, reasonable, appropriate or valued than others," The adopted sets of actions "eventually guides the focal actor's decision-making" (Goretzki & Messner, 2018, p. 3).

To avoid the tensions arising from different roles and identities, and to mitigate their negative effects on the individual and organization, conventional wisdom and organizational practices suggest reconciliation. Horton and Wanderley (2018) posited that the management accountants' desires to be more engaged in business activities, including sustainability related actions, are perceived as "meddlesome and intrusive," and as a result, "management accountants are sometimes forced to reconcile their own desires for greater business involvement with managerial resistance to participatory actions" (p. 42).

This reconciliation is developed based on the dominant business case paradigm and instructs organizational actors to "constrain" multiple identities in favor of the greater

organizational good, based on commercialism, bureaucracy, and financial gain (Byrne & Pierce, 2007; Morales & Lambert, 2013). This recommended reconciliation approach is related to the defensive response to paradoxes known as repression. Organizational actors who respond to role and identity paradoxes through repression usually ignore, block, or deny the tensions they experience when their roles and identities do not align perfectly (Jarzabkowski et al., 2013; Lewis & Smith, 2014). While reconciliation may appear to work in the short-term, it is a temporary fix that leads to what Lewis and Smith (2014) referred to as a vicious cycle (see Figure 1).

Learning Tensions in Corporate Sustainability

Organizations are dynamic and complex entities that need to re-assess their objectives, make adjustments to previous orientations, and be responsive to internal and external stakeholders to survive. In short, organizations need to "learn" in order to exist. According to Argyris and Schön (1996), organizational learning constitutes a change in the behavior of the organizational members that is triggered by a change in the underlying "theory in use" by the organization. Viewed from a paradoxical perspective, tensions are caused by the simultaneous existence of "old" and "new" theories. In fact, the tension between exploration and exploitation is one of the most studied learning paradoxes in management and organization research (Jarzabkowski & Fenton, 2006; Jarzabkowski et al., 2013). Organizational learning becomes paradoxical when the organization's beliefs and assumptions fail to keep pace with contextual change (Lewis, 2000; Ozanne et al., 2016).

Organizational learning is an interactive process characterized by "emotional, relational and political complexities and contradictions of learning" (Vince, 2018, p. 279). Learning tensions present themselves as organizations "change, renew, and innovate"(W. Smith & Lewis,

2011, p. 383). Organizational learning is demonstrated through changes in behavior. Drawing inspiration from Argyris and Schön (1996), and socio-psychological literature that emphasizes the link between learning and behavior, Siebenhüner and Arnold (2007), who worked at the intersection of organizational learning and sustainable development, crafted a definition for sustainability-oriented learning within organizations. Those scholars defined sustainability-oriented learning as a "process where organizations display behavioural changes that are attributable to a change in the knowledge and value base as a result of reflexive processes, and where the concept of sustainability served as a fundamental framework" (Siebenhüner & Arnold, 2007, p. 342). This definition adds the dimension of tension to organizational learning by stipulating the need for a "sustainability framework." Learning in the sustainability context is particularly paradoxical given the multiple perspectives and the " vagueness and multiple facets of the sustainability concept" (Siebenhüner & Arnold, 2007, p. 342). Sustainability learning requires organizational actors to "learn to deal with high levels of uncertainty, [multiple] time horizons and the interaction of ecological, social and economic systems as well as multi-level thinking to link local, regional and global perspectives (Siebenhüner, 2005).

Typical Responses to Learning Tensions

In response to the challenges of organizational learning, actors experience a "discomforting tug-of-war" and often respond "defensively" (Vince, 2018, p. 275). This response is typically characterized by "clinging to the pole that supports their preferred priorities, skills, and routines" (Lewis & Smith, 2014, p. 135). In the context of sustainability, the defensive response to learning appears as maintaining a status quo that favors the financial dimension of corporate sustainability. In this setting, the organizational actors align their thought processes and behaviors primarily with financial considerations. This response, referred to in the paradox

theory literature as reaction formation, does not foster learning in the sustainable context and creates additional issues that feed the vicious cycle.

Encouraging learning in organizations has become a “critical challenge for managers given the important role it plays in encouraging creativity and innovation” (Naudé, 2012, p. 527). This is especially true for organizations striving to advance social and environmental agendas. This observation has led to the presence and mixed views of the learning organization. While acknowledging the dualities and tensions present in organizational learning, Driver (2002) proposed that practitioners and the academy adopt a “middle ground” that acknowledges the paradoxes involved in learning, but seeks to resolve these conflicts, possibly via a “trade-off.”

The middle ground approach is understandable given the level of unease and cognitive dissonance often brought on by the presence of a paradox. In fact, Driver (2002) described the paradoxical tensions involved in learning as "potentially painful employee experiences" (p. 33). Isil and Hernke (2017) found that sustainability practices in such organizations offer no challenge to conventional management thinking, business models, or management practices.

Temporal Tensions in Corporate Sustainability

Beyond the types of corporate sustainability paradoxes identified in psychology and paradox streams of literatures and discussed above, I submit that there is a fifth type of unresolvable tension that is unique to corporate sustainability in the area of accounting: what I call temporal tension. As depicted in Figure 1, this tension embodies the persistent contradictions present in the accounting function among the multiple dimensions of sustainability in the short-, intermediate-, and long-term. These tensions manifest themselves in the multiple dimensions of corporate sustainability, the variety of interest groups accommodated by the corporate sustainability concept, and the temporal differences in the design and implementation of the

MCS. Taken together, all of these considerations can lead to a system with paradoxical temporal objectives; that is, time-related objectives that are diverse yet related, and possibly contradictory yet persisting across multiple timeframes.

Based on the types of paradoxes reviewed earlier, the corporate sustainability temporal tension is possibly a meta-paradox because it spans across all of the types of corporate sustainability paradoxes. Each dimension of corporate sustainability focuses on a different time horizon and thus requires different time outlooks, different reporting, and different disclosures from the accountant. The accountant is challenged, constrained, and empowered by living in the present, and using present value and discounted accounting numbers to predict future environmental, social, and economic performance. For example, environmental timelines can extend to hundreds or even thousands of years; social timelines tend to be generational; and the financial timelines are usually monthly, quarterly or annual. The accounting for each of these temporal differences is ongoing, irresolvable, and therefore paradoxical. I call these time-related tensions the corporate sustainability temporal paradox.

The temporal paradox permeates all four existing sustainability paradoxes. During the organizing paradox, the issue of how to choose organizational structures, processes and leadership that will focus on current sustainable goals with minimal or no negative consequences on future sustainability goals is particularly salient. Once the initial organizing tensions and related reporting are addressed, the accountant must then develop performance measures that will motivate organizational actors to pursue sustainable goals with multiple time horizons. The learning paradox involves deciding how the organization can create an atmosphere conducive to current and future understandings of corporate sustainability. Finally, the temporal element of the belonging paradox is the constant evolution of the accountant's roles. Gao and Bansal (2013)

supported this notion of the corporate sustainability time paradox and suggested that since the "pillars of sustainability are inherently positioned within different time scales—short, medium and long," organizations need to adopt strategies that "accommodat[e] the multiple time frames" (p. 246).

The concept of corporate sustainability suggests that current and future organizational growth should be dependent on the degree to which the organization contributes to "environmental integrity, economic prosperity, and social equity at the societal level" (Hahn & Figge, 2011, p. 327). Implicit in this concept is the role of the temporal paradox in helping to evaluate the response to, and actions resulting from, the other paradoxes. In other words, the temporal paradox in corporate sustainability dictates that responses to organizing, belonging, performing, and learning paradoxes today lead not only to the existence of tomorrow, but possibly to a better tomorrow.

Embedded in the controls systems of sustainability accounting are artifacts related to time, such as: strategic and tactical goals, long-term vs. short-term assets and liabilities, and immediate vs. delayed recognition systems. Lewis (2000), as well as Smith and Lewis (2011), identified the intertemporal tension between companies' short-term and long-term focus as an important paradox for companies to manage. Short-termism has been defined as "a preference for actions in the near term that have detrimental consequences for the long term", while long-termism is viewed as management's "behavior that focuses on the long term to the detriment of the short term (Marginson & McAulay, 2008, p. 274). These definitions suggest that the consequences of actions in one time frame are experienced in another time frame. Ideally, managerial decisions would yield beneficial results in both the present and in the future, but that

is not always the case. Therefore, intertemporal paradoxes are embedded in many managerial decisions.

As they provide information to support decision making, many accounting systems form numerical bases for producing firm values in the near and distant future. These numbers are usually required by capital markets. For example, an accounting system provides the data which can be used to calculate return on investment (ROI) and quarterly earnings per share (EPS), both of which measure a firm's short-term performance. The accounting system also feeds measures related to investments in research and development (R&D), and overall firm value, both of which are measures of a firm's long-term performance (Orton & Weick, 1990). Some scholars believe that accounting tools and control systems are not neutral, and so, the numbers it produces are likewise not neutral. Thus, the accounting function for corporate sustainability is embedded in the temporal paradox. In fact, Laverty (1996) suggested that management's "most important problems involving intertemporal choice are those decisions… with respect to maximizing profit [in the short-term] or achieving some other objective" (p. 828).

Typical Responses to Temporal Tensions

Currently, the most dominant approach to managing the temporal aspects of corporate sustainability tensions is the "instrumental approach"(Gao & Bansal, 2013, p. 246). Gao and Bansal (2013) describe management's use of the instrumental approach as operating in "a conventional single time frame in decision-making" related to corporate sustainability and that time frame "tends to be rather short" (p. 246). Research suggests that when organizational leaders, with a short-term focus, face decisions that require a consideration of current and future needs, they "typically focus on the short term at the expense of the long term"(Slawinski & Bansal, 2015, p. 531). The instrumental approach focuses heavily on the short-term and is

therefore less accommodating of the other timeframes. Gao and Bansal (2013) caution against the excessive focus on the short term and even suggest that short-term based solutions in corporate sustainability "often cause other problems, leading to escalating tensions and dilemma" (p. 246).

Managements' focus on the short-term is understandable considering some of our human biases such as: our low tolerance for uncertainty, our high demand for instant gratification and our appetite for above-normal profits (Bansal & DesJardine, 2014; Loewenstein & Thaler, 1989). Admittedly, accountants have made attempts to satisfy such biases and capture a time dimension in relation to corporate sustainability as is evidenced by including discount factors in some of our reporting (Bansal & DesJardine, 2014; Slawinski & Bansal, 2015). However, such reporting is still biased towards the short-term and is not capturing the full impact of corporate actions since there is very little reporting for externalities and nonfinancial impact. Additionally, the effects of current actions may reveal themselves in future timeframes outside of the accounting window. Furthermore, according to Slawinski and Bansal (2015), "discounting the future relative to the present can contribute to short-termism" (p.532).

I evaluate the responses to corporate sustainability temporal tensions that focus primarily on the (1) short-term and (2) discounting the future as related defensive responses. More specifically, I view them primarily as a combination of reaction formation and ambivalence, respectively. First, when organizational actors actively choose to focus on the short term aspects of corporate sustainability, they are aligning with one side of the paradox and that often leads to the polarization of the other sides, namely intermediate- and long-terms (Jarzabkowski, Lê, & Van de Ven, 2013; Lewis, 2000). Second, management accountants attempt to integrate other aspects of the corporate sustainability temporal tensions in decision making through discounting

is ambivalence since such actions do not approach the tensions in its full strength. Together, this process of aligning with the short-term aspect of corporate sustainability, while making a "lukewarm" effort to integrate other dimensions via discounting, has arguably given rise to the potentially vicious cycle we currently known as the business case for corporate sustainability (Hahn, Preuss, Pinkse & Figge, 2014).

Putting it all together, the preceding section identified some of the tensions present in corporate sustainability and mapped those tensions to the taxonomy for "types of paradoxes" that exists in the growing paradox literature outside of management accounting. Relying on my understanding of the responses to paradoxes, I then classified the current responses to the aforementioned corporate sustainability paradoxes and highlight the potentially negative repercussions of these responses. I also introduce and develop the concept of corporate sustainability temporal paradox as the interconnected, time-related dimension of the corporate sustainability concept that is present in, and possibly subsumes all of the types of paradoxes identified. I captured the relationships among the types of corporate sustainability paradoxes as well as the typical responses pictorial in Figure 1. As such, Figure 1 represents the theoretically driven identification of the types of paradoxes specific to corporate sustainability and the types of embedded responses discussed in the previous sections. In the next section, I offer recommendations on how to move the academy and practitioners from defensive responses and vicious cycles to active responses and virtuous cycles, this is also depicted in Figure 1.

Using Paradox Theory to Motivate Corporate Sustainability Accounting Research

Corporate sustainability presents decision makers with a plurality of competing, and often inconsistent, processes, goals, stakeholders, time horizons, and reward structures. Smith and

Lewis (2011) suggested that multiple goals tend to challenge managers' "bounded rationality and stress [existing] systems" (p. 390). In response, managers tend to "break apart interwoven elements into either/or decisions, practices, and understanding, blurring their interrelatedness" (Smith & Lewis, 2011, p. 390). As shown in Figure 1 (see Appendix), I postulate that this desire to separate related tensions is cognitively and organizationally driven by instrumental rationality as shown in earlier sections on typical responses.

Paradoxical cognition is an alternative to instrumental rationality. It encourages the mental agility needed to work through and accept corporate sustainability paradoxes. In turn, organizational actors will be equipped to create organizational structures and processes that embrace these paradoxes. I suggest that paradoxical cognition uses the same mechanism for embedding active responses to tensions as instrumental rationality. That is, the pattern of active responses aimed at accepting paradoxical tensions are embedded into organizations via repeated use of such responses. The recurring use of the active responses, underlined by paradoxical cognition, fuel the virtuous cycle.

Working through paradoxes in corporate sustainability is imperative. The organization's going concern, and more importantly, the survival of our planet, depend on active managerial responses to paradoxes. In a longitudinal case study of a telecommunications company, Jarzabkowski et al. (2013) suggested that an organization's very survival may be "threatened when managers attempt to avoid or circumvent … paradoxes," while managers' "proactive responses that accept the paradoxes permit an organization to move on and live with the paradox" (p. 246). In this section, I put forward arguments for an alternative response to such tensions: one rooted in paradoxical theory.

A Paradoxical Approach to Managing Tensions in Corporate Sustainability

Scholarly work on paradoxes in management and psychology literature has suggested that organizations experience more success when they manage strategic contradictions and tensions with a both/and, rather than an either/or, perspective (Bedford, 2015; Eisenhardt et al., 2010; Schreyogg & Sydow, 2010; Smith & Lewis, 2011). This both/and approach, rooted in paradox theory, can be applied to management practices within corporate sustainability. Management accountants can achieve this goal by adopting a "paradoxical framing" that can help them "recognize and accept the simultaneous existence of contradictory forces" (Smith & Tushman, 2005, p. 526).The following section applies this concept to each corporate sustainability paradox identified in this discourse and suggest associated research questions.

Paradoxical Response to Organizing Tensions

Within the organizing paradox for corporate sustainability, management accountants can be encouraged to continuously embrace the tensions and contradictions surrounding the structure, process, and leadership brought on by considering sustainability objectives. A control system born out of paradoxical cognition is able to accommodate and even encourage "dynamic tension that encourages decision makers to simultaneously address demands" (Bedford, 2015, p. 15), even if those demands are potentially conflicting and not primarily economically focused. I propose that, to yield these results, the most appropriate design of a control system would be one that is intentionally paradoxical in regard to the integration of sustainability elements and links to organizational strategy. The resulting configuration, to borrow Gond et al.'s (2012) terminology, is a control system that is "simultaneously open and closed" (Orton & Weick, 1990, p. 204).[4]

[4] These scholars did not necessarily develop their loose coupling argument in the context of sustainability; they did so in a more general organizational context. Orton and Weick's (1994) arguments were echoed by Hahn et al. (2014, 2015, 2017). In particular, Orton & Weick (1990) argued that, "although

Similar to the loosely coupled control systems in current literature I envision a paradoxical control system (PCS), based on complex integrative logics, that takes into account the multiple dimensions of sustainability. My vision of a PCS can be described as a control system in which the dimensions of corporate sustainability are integrated and responsive to a certain degree, "but retain evidence of separateness and identity" (Weick, 1979, p. 3). A paradoxically designed control system would contain interdependent traditional and sustainable control mechanisms or elements "that vary in the number and strength of their interdependencies" (Orton & Weick, 1990, p. 204). The level of integration, or coupling, in such a control system could then vary in response to the tensions within an organization. In this respect, a paradoxically conceived MCS would work in what Smith and Lewis (2011) referred to as a dynamic equilibrium, thereby facilitating "constant motion across opposing forces" (p. 386).

The ideas put forward above may be tested empirically using a variety of research methods. As a starting point, to test these theoretical musings and to help the academy garner a more practical sense of the impact of approaching the organizing tensions in corporate sustainability from a paradoxical perspective, I offer the following research questions:

RQ1: How does the manager's cognitive frame affect the design, implementation and use of the MCSs in organizations pursuing corporate sustainability?

RQ2: How do managers use MCS to manage tensions between business case vs non-business case thinking?

RQ3: What organizational arrangements best facilitate the manager's adoption of a paradoxical cognition?

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organizational forms are designed to deal with inherent contradictions, the language of organizational scholars does not allow them to capture this reality" (p. 204). As a result, they caution such scholars not to "simplify their analyses either by ignoring uncertainty to see rationality or by ignoring rational action to see spontaneous processes (Orton & Weick, 1990, p. 204).

Paradoxical Response to Performing Tensions

Achieving sustainability requires "multiple tasks and require[s] decisions based on a variety of different factors" (Virtanen, Tuomaala, & Pentti, 2013, p. 404). The paradoxical approach to performing tensions in corporate sustainability would seek to provide performance measures that encompass an organization's multiple tasks, decisions, and factors.

Extant research in management accounting suggests that the reliance on formal incentive systems can have a " negative effect on intrinsic motivation" (Virtanen et al., 2013, p. 404) related to sustainability. As with the PCS system I propose, the paradox approach to performance measures would need to simultaneously address multiple ways of motivating organizational actors to pursue sustainability in its full strength. The actual measures can be both financial and non-financial, formal and informal, and span multiple time horizons. Furthermore, the performance indicators may be linked to the organizations' sustainability strategy. Measuring performance resides with management accountants and also forms a major part of management accounting research. Therefore, I believe that further research in the area of corporate sustainability geared towards shedding light on the performance systems and the resulting indicators that could help promote corporate sustainability could be helpful to the academy. I suggest that future research agendas can start by examining:

RQ4a: What attributes of a reward system could promote sustainability beyond the business case (social and environmental sustainability)?

RQ4b: How would a reward system vary with the dimension of corporate sustainability being promoted?

Paradoxical Response to Belonging Tensions

Contrary to popular academic literature that views identity struggles, conflicts, and tensions as transitory—that is, as a step towards resolution (e. g., Alvesson, 2010)—I suggest that identity tensions, particularly in the area of corporate sustainability, may be viewed as unresolvable. For example, at some point, external demands from social and professional groups, demands from multiple organizational stakeholders, variety of job reporting requirements from within the sustainable organization, or self-doubt are likely to be out of alignment with a management accountant's sense of self. Actors in sustainable organizations will encounter ongoing identity-provoking situations and so I recommend confronting, engaging with, and accepting these belonging paradoxes.

To productively deal with tensions that arise due to multiple identities and role conflicts, I propose the adoption of paradoxical cognition throughout the organization. Rather than suppressing the multiplicity inherent in management accountants' identities and roles within a sustainable organization, I suggest using those conflicts and tensions as a trigger for change towards corporate sustainability. Effecting the proposed changes would require some degree of sense-making among organizational actors. The ultimate objective is to create an organizational environment in which role and identity tensions are not perceived as "failure[s] or inadequac[ies]" but rather as "intrinsic features of a healthy organization" (Audebrand, 2017, p. 374; Harter & Krone, 2001).

Using an approach more similar to the "self-questioning" orientation to the corporate sustainability belonging paradox could be helpful in moving towards working through and ultimately accepting this paradox. A self-questioning approach to identity work focuses on the process and "neither aims for nor achieves… resolution" (Beech et al., 2016, p. 509). I propose that the paradoxical orientation toward the corporate sustainability belonging paradox can focus

on both the process and the outcome, with the outcome being acceptance of the paradoxical tensions among multiple roles and identities. This approach can allow the tensions and contradictions between among identifications to be "viewed as natural expressions of such multiple, relational selves and examined from a variety of constructive interpretive perspectives" (Hartman, 2015, p. 30).

In context, the process of openly discussing the factors that give rise to and sustain the multiplicities of roles and identities provides an opportunity to confront the belonging paradox in corporate sustainability. In the paradoxical literature, this recommended response is considered a type of the confrontation response. Confrontation offers a forum to for open discussion, which could help management accountants examine the logics and emotions used in creating their roles and identities. This process could to lead to greater appreciation of the socially constructed nature of tensions and ultimately increase the individuals' and organization's "chances of escaping paralysis" (Lewis, 2000, p. 764).

Practically, I suggest that top management steer the organization towards a more paradoxical orientation. They may accomplish this task by demonstrating this attitude themselves and putting in place formal and informal systems that allow rank and file employees to safely confront the belonging paradox. Management accountants may likewise focus on the process of constructing and reconstructing their roles and identities while appreciating that the contradictions among these tensions is ongoing. Fundamental to this process is a shift away from the current management perspective that conflicts and struggles in identity should be resolved.

An organization's reaction to sustainability tensions is a function of its decision-making. Relatedly, top level organizational leaders may have greater control over management accountants' roles than over their identity. As such, adopting a paradoxical perspective at the

organizational level has the potential to help management accountants become more appreciative of the conflicts inherent in their identity and role. Gray (2019) suggests that the absence of "discomfort" when dealing with sustainability suggest "an absence of sustainability" (p.49). While I acknowledge that there are many inter-organizational factors that shape the roles and identities of management accountants, the scope of this work focuses primarily on the intra-organizational factors. Therefore, I propose that future research may seek to delve deeper into the paradoxical tensions that exists between the manager's personal stance on corporate sustainability and the corporate culture in which she/he operates. I suggest research questions aimed at uncovering how managers manage these tensions at work and outside of work, such as:

RQ5: How are belonging tensions in corporate sustainability addressed (e.g., through defensive, active or some combination of these responses)?

Paradoxical Response to Learning Tensions

I propose a learning paradox perspective on corporate sustainability that does not rely on traditional frameworks that seek consistency and simplicity, but rather one that "emerges from the surprising, counterintuitive and tense" (Lewis and Smith, 2014, p. 143), embraces competing forces, and thrives on tensions. Lewis and Smith (2014) suggested that paradoxical cognition can be especially useful when organizations have complex, multifaceted goals, as is the case with organizations aimed at sustainability. As part of the management team, management accountants can help by emphasizing that learning in the area of "sustainability in an ongoing, iterative process" (Lewis & Smith, 2014, p. 134).

The sustainability-oriented learning process could become a reality by infusing sustainability into the concepts of single and double-loop learning. Argyris (1993) offered a distinction between "single-loop" and "double-loop learning" based on the intensity of the

required change relative to the starting point—what he refers to as the "existing frame." While single-loop learning signifies incremental variations within an existing frame, double-loop learning denotes a more radical or episodic reframing. Applied to the context of this study, single-loop learning would result in small, minor changes towards sustainability. On the other hand, double-loop learning would yield substantial, dramatic changes in understandings and actions with respect to corporate sustainability (Lüscher & Lewis, 2008).

Furthermore, Argyris (1993) theorizes that the extent to which learning changes happen depends on the magnitude of the "shock" or "surprise" within or across existing frames. Complete disruptions require radical reframing; that is, double loop learning. This type of learning is intentional, active, and "extends beyond the diffusion of known or accepted knowledge" (Siebenhüner & Arnold, 2007, p. 342).

I propose that this process start simultaneously at multiple levels within the organization. This will serve to "shock" managers out of their business-case views and behaviors towards more corporate sustainability. Once this episodic learning has been adopted by managers, employees will incrementally migrate to the new frame through formal training and mentoring. The ultimate aim is the acceptance of the new frame by all.

Future research focused on learning within a corporate sustainable organization can seek to uncover the relationship between paradoxically implemented organizing and performing changes on learning in the area of corporate sustainability. A starting point could be to investigate the following research question:

RQ6: How does the paradoxically motivated reward system and cognitive frames of managers interact in a sustainable decision-making process?

Paradoxical Response to Temporal Tensions

When today becomes yesterday and tomorrow becomes today, the temporal paradox in corporate sustainability dictates that responses to organizing, belonging, performing and learning paradoxes today lead not only to the existence of tomorrow, but possibly also to the existence of a better tomorrow. To this end, I propose that sustainable organizations adopt a paradoxical perspective related to time in the area of corporate sustainability. This perspective can focus on viewing time as relational without any predominance to any particular time frame. This would, however, require a paradigm shift from the predominate method of perceiving and accounting for time frames as discrete and episodic to viewing time as more seamless and fluid (Slawinski & Bansal, 2012). I envision that this shift in perspective could yield more mutually reinforcing results in corporate sustainability, which would benefit the environment, society and organizational actors in the short, medium, and long-term. These benefits would be achieved since the paradox perspective serves to exploit the complementarity and interdependence (Lewis, 2000; Poole & Van de Van, 1989) present in the temporal aspect of corporate sustainability.

A paradoxical perspective on the temporal aspect of time in corporate sustainability could help to prevent organizations from picking one timeframe over the other or inclining towards short-termism. Framing temporal tensions as paradoxes can help organizational actors recognize that these tensions can coexist (Clegg et al., 2002; Smith & Lewis, 2011). Practically, the perspective discussed above would require that accounting professionals exhibit characteristics similar to those exhibited by managers who offered a more integrated approach to greenhouse gas (GHG) emissions in Slawinski and Bansal's (2012) study. The managers in that study showed a high tolerance for future uncertainty, reflexively drew from the past, and integrate multiple planning horizons on sustainability projects (Slawinski & Bansal, 2012).

Furthermore, Slawinski and Bansal (2009) suggested that management accountants who adopt a "harmonized time orientation" can transcend the intertemporal tensions associated with long- versus short-term paradoxes. This harmonized view allows managers to "consider issues using multiple time frames"; these multiple frames can then lead managers to consider a "plurality of logics, beliefs, paradigms, and to reflect on the distinctions and overlap between polarized positions" (Slawinski & Bansal, 2009, p. 4), all of which can lead to improved decision making. This plurality of viewpoints could be extended to the design of the package control systems used to account for a firm's transactions and its value.

Corporate sustainability temporal tensions are under researched in accounting and other disciplines. While Slawinski and Bansal acknowledge that temporal tensions are at the core of sustainability, they also remark that "surprisingly little research has been directed at unpacking this tension in either business sustainability research or organization science more broadly" (2015, p. 531). Therefore, intentionally adding a temporal dimension to each of the research questions stated in the previous section can help us further understand tensions among the dimensions of corporate sustainability paradox and its effects on managerial decision making in the short, intermediate and long terms. This approach to researching corporate sustainability calls for the use of more longitudinal qualitative studies as well as more repeated measure experimental studies that evaluate the dependent variables across multiple time frames.

For example, temporally related corporate sustainability research questions could begin by asking:

RQ7: What attributes of a MCS help promote sustainability in the short-, intermediate-, and long-terms?

RQ8: How does the organizational arrangements that best facilitate the manager's adoption of a paradoxical cognition change with time?

RQ9: How do the accountants' responses to belonging tensions in corporate sustainability coevolve over time (e.g., interaction between defensive, active or some combination of these responses)?

RQ10: What are the interactive effects of the paradoxically motivated reward system and cognitive frames, of managers, on sustainable decision-making process across multiple time frames?

The link between managerial accounting and corporate sustainability is summarized by Soderstrom et al (2017). There is currently a lack of scholarship on paradox theory and a failure to address the multidimensionality of the corporate sustainability construct. Further studies are needed to explore the links between managerial accounting and corporate sustainability using a paradoxical lens. These lenses will allow researchers to explore the tensions inherent in the simultaneous pursuit of environmental, social and financial sustainability. I propose that academic scholars could undertake additional studies at the intersection of management accounting and corporate sustainability.

Conclusions

Paradoxical thinking underscores the idea that organizational issues are not discrete and hence should not be viewed as predictable or easily resolved with the application of a grand theory (Westerholtz, 1988). On the contrary, paradoxical thinking embraces the fact that organizational issues are often difficult to delimit and quantify and often have no predictable solution. Corporate sustainability, with its multiple dimensions and potentially conflicting demands, is paradoxical in nature. However, current research in accounting and sustainability generally do not address corporate sustainability as a paradox. Instead, practitioners and researchers tend to treat corporate sustainability as a tension-free phenomenon. In so doing, they choose a reductionist approach that subjugates social and environmental dimensions to the financial.

I propose the adoption of paradoxical framework as a powerful theoretical lens to re-examine corporate sustainability. To do so, I call on management accountants specifically in the area of corporate sustainability to revisit their organization's MCS, as this system is at the core of any organization. It influences and is influenced by organizational actors. In response to stakeholders' cries for the integration of more sustainable practices, I suggest that management adopts a paradoxical mindset in the design and implementation of the MCS.

This present work represents the initial theorization around the temporal tensions inherent in the concept, practice, and, accounting for, corporate sustainability. I anticipate that this initial step will serve as a "discussion starter" for practitioners and scholars working in this area. The concept of corporate sustainability is inextricably linked to dimensions of time. Therefore, I suggest accounting for "time" in all sustainability-related management accounting decisions without sacrificing the future. This approach requires the degree of paradoxical thinking that transcends time.

I acknowledge that there are limitations in the above discourse. Many are related to the scope of scholarly work reviewed, the linear presentation of the concepts and their relationships, and others may be related to the practicality of the recommendations. Nevertheless, if the research questions outlined in this work are pursued with academic rigor, then the answers to those questions have the potential to add external validity and further contribute to the body of knowledge at the intersection of accounting and corporate sustainability.

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STUDY TWO: THE INTERACTION OF COGNITIVE FRAMING AND PERFORMANCE MEASUREMENT AND REWARDS ON MANAGERS' SUSTAINABILITY DECISION MAKING

Study Two Abstract

In corporate America, the concept of sustainability is rife with tension. Some of the tension is inherent in the definition of sustainability, while other tensions are caused by stakeholder pressures and organizational arrangements. Due in part to the multiple and potentially contradictory dimensions of sustainability, how corporate managers respond to these tensions can have long lasting effects on the organization and society. A large body of research suggests that the decision makers' cognitive processes are important to corporate decision making (Aguinis & Glavas, 2012), especially in the sustainability context. Currently, it appears that a "business case" cognitive frame dominates organizational decision making (Gao & Bansal, 2013; Hahn & Figge, 2011). The business case frame directs organizational actors to undertake only those sustainable actions that will yield a financial benefit for the organization.

This research draws on paradox theory which suggests an alternate form of managerial cognition, a paradoxical cognitive frame, might better support managerial decisions around sustainability where competing logics exist. Furthermore, prior research is inconclusive as to whether a more diverse set of performance measures, that is broad goals, or a more targeted set of measures, that is narrow goals, better incentivize corporate sustainability decision making. Therefore, in addition, this research seeks to uncover which organizational reward structure better supports each cognitive frame. The results reveal that adopting a paradoxical cognitive frame combined with a reward structure that promotes broad goals facilitates more sustainable

managerial judgments. These findings are important given the social and environmental implication of judgments related to sustainability, in terms of both products and operations.

Keywords: sustainability; paradox; business case; cognition; management accounting; supplier selection; experiment.

Introduction

Stakeholders are pressuring companies to become more sustainable and to extend sustainable practices to their supply chains (Hartmann & Moeller, 2014). Sustainability practices include those corporate actions that would allow companies to "meet the needs of the present without compromising the ability for future generations to meet their own needs" (Brundtland, 1987, p. 16). Recent media attention has focused on issues such as apparel stores operating sweatshops overseas and restaurants serving meats bought from farms which do not raise animals in a sustainable manner (Pena, 2017; Taylor, 2015). In this context, unsustainable supply chain practices entail adverse economic, social, and/or environmental actions which ultimately affect human well-being (Gao & Bansal, 2013). Research suggests that consumers are holding companies accountable for products and services "associated with suppliers that engage in unsustainable behaviors," regardless of the distance from the supplier (Hartmann & Moeller, 2014, p. 281). Stakeholders including practitioners and government agencies have called for more sustainable supply chain management (KPMG 2013). For example, the California Transparency in Supply Chains Act (CTSCA 2012) makes it mandatory for any large company doing business in California to publicly disclose its efforts to eradicate forced labor and human trafficking in its supply chain (Harris, 2015).

The possible widespread consequences of unsustainable business practices suggest that the impact of sustainability "far exceed those of many other corporate issues" (Andersson & Bateman, 2000, p. 549). No longer are stakeholders satisfied with only the company's "self-serving" disclosures (Cho, Roberts, & Patten, 2010), rather they expect sustainability to extend beyond "talk" (Cho, Guidry, Hageman, & Patten, 2012), and to permeate all aspects of the company's operations including the supply chain.

Despite its increasing importance, research on how managers incorporate sustainability factors into their decision-making process is sparse. This lack of traction could be due in part to the fact that sustainability is theorized to be a multidimensional construct comprised primarily of economic, environmental and social dimensions. These dimensions are interconnected yet divergent and the relationship among the dimensions creates tension (Hahn, Preuss, Pinkse, & Figge, 2014; Hahn, Figge, Aragón-Correa, & Sharma, 2017). That is, tension arises since each of the ‘‘inextricably connected and internally interdependent’’ dimensions of sustainability appear desirable in isolation (Bansal 2002, p. 123), yet oftentimes progress towards any single dimension might have unintended consequences or "detrimental effects for other sustainability" dimensions (Hahn et al., 2017). For example, for a clothing manufacturer, sourcing the "best" price on cotton to be used as a raw material may lead to the worsening of working conditions for workers on the cotton farms. To satisfy stakeholders demands for sustainable products, company managers need to make decisions that are expected to simultaneously reduce or minimize environmental impact, benefit social welfare, and return a satisfactory economic profit for the company. Furthermore, since corporations are not self-contained units, such decisions extend beyond legally designated borders and into the corporations' global supply chain.

Currently, it appears that business case logic, which suggests that companies engage in sustainable activities if, and only if, those activities produce a direct financial benefit, dominates organizational decision making (Gao & Bansal, 2013; Hahn & Figge, 2011). Arguably, this focus on the business case logic uses linear thinking (Van der Byl & Slawinski, 2015), and may result in short term decisions that do not fully address all of the dimensions of sustainability and its tensions (Hahn & Figge, 2011; Hahn et al., 2017; Jarzabkowski, Lê, & Van de Ven, 2013;

Smith & Lewis, 2011). In fact, Jensen (2001) suggests that the inclusion of multidimensional societal goals complicates the otherwise rather simple objective function of the company.

Recent theoretical work by Hahn, Preuss, Pinkse, and Figge (2015) suggests that a paradoxically derived cognitive[5] frame is an alternative to the business case frame. Hahn et al. (2015) posit that managers operating in a paradoxical cognitive frame accept tension and embrace ambiguity. In a sustainability context, they achieve this goal by recognizing and accepting the contradictory nature of sustainability signals (Hahn et al., 2015). Managers operating in a paradoxical frame are theorized to possess the ability to simultaneously evaluate the multiple and potentially contradictory dimensions of a sustainability issue and make decisions without any one dimension being the predominant driver of those decisions (Hahn et al., 2015; Smith & Lewis, 2011). These suggestions have not been tested empirically. Therefore, this research will contribute by examining the effects of business case and paradoxical cognition on managerial decision making in a sustainability context.

Likewise, within the sustainability context, little is known about the contextual organizational factors that produce more sustainable behavior and facilitate different cognitive frames. Managers design and operate within organizations structures and control systems. The control systems then influence and are in turn influenced by organizational culture and organizational culture can encourage or discourage the use of specific cognitive frames. The formal or informal organizational systems may be broadly labeled management control systems (MCS). MCSs were traditionally developed to primarily assist organizational leaders in aligning organizational and behavioral structures with the goals of the organization (Gond et al., 2012). One way in which the MCS does this is via the performance measurement system, which

[5] Cognitive frames are knowledge structures and templates that shape the way individuals absorb, process, and disseminate information and how they interpret tensions and contradictions (Walsh, 1995).

typically determines the specific evaluation, incentive and reward structures of the organization. The scope of a performance measurement system (PMS) can be classified as broad or narrow and captures the focus, quantification, time horizon and orientation of the performance measures (Bouwens & Abernethy, 2000; Chenhall & Morris, 1986; Naranjo-Gil & Hartmann, 2007). As a result, I analyze the organizational environment from the prospective of the performance measurement system (PMS) and the representation of the elements in such systems. More specifically, I use the notions of broad and narrow performance measurement archetypes to tease out their effects on sustainable decision making when managers are operating under a business case or a paradoxical cognitive frame.

The lack of studies that theorize managerial cognition, as well as limited knowledge about the organizational factors regarding sustainability decisions have spurred researchers to call for theory-driven investigations of decision-making specifically related to supply chain sustainability, as well as an expansion of the "methodological repertoire" used in sustainability research (Aguinis & Glavas, 2012, p.954). Therefore, using the cognitive theories and PMS contextual factors together, I formulate the following research questions: "What effect do business case and paradoxical thinking have on the sustainability-related decisions of corporate managers?" and 2) "What qualities of performance measurement systems facilitate paradoxical thinking, and, in turn to the selection of a more sustainable supplier?"

This study addresses recent interdisciplinary calls for more integration of theoretical conceptualization into sustainable supply chain management research (Burritt & Schaltegger, 2014; Carter & Rogers, 2008; Gopalakrishnan, Yusuf, Musa, Abubakar, & Ambursa, 2012; O'Dwyer & Unerman, 2016; Seuring & Müller, 2008; Wong, Wong, & Boon-Itt, 2015). It does so by examining managerial sustainable decision-making through cognitive and organizational

control systems theories. My objective is two-fold; under experimental conditions, I examine the effects of two cognitive frames: business and paradoxical, on sustainability decisions, and I evaluate which performance measurement archetype, broad or narrow, moderates each of these cognitive frames.

To achieve the above stated purpose, I conduct a 2 (cognitive frame: business case/paradoxical) X 2 (performance measurement focus: broad goals/narrow goals) online experiment using a supplier evaluation and selection task setting. I gained access to one hundred and ten managers via Amazon's Mechanical Turk. Each manager was compensated a flat rate of $3.00 for his\her time, this pay rate is considered above average based on Buchheit et al. (2018). They first participate in a task developed by Miron-Spektor et al. (2011) that stimulates either a business case or paradoxical cognitive frame. Participants then assume the role of purchasing manager in a hypothetical company and read a narrative concerning the company's need to evaluate potential suppliers. Included in the narrative is information about the company's performance measurement system. Half of the participants make decisions under a broad set of performance measures and rewards that highlight both shorter-term financial and longer-term non-financial goals while the other half make decisions under a narrow set of performance measures and rewards that highlight short-term financial goals. Next, participants review information about a set of potential suppliers, some of which utilize more sustainable practices than others, evaluate these suppliers, and make recommendations about which suppliers' contracts to accept. The dependent variable is measured as the percentage of the cotton contract awarded to the more sustainable supplier.

The results reveal that on average, managers operating in the paradoxical cognitive frame and operating under broad performance goals made more sustainable decisions. As predicted,

cognitive frame and performance measurement focus have an interactive effect on the purchasing managers' decisions about how much of a company's supply contract to award a sustainable supplier. Specifically, when the managers are operating under the paradoxical cognitive frame and broad performance measurement goals, they awarded the sustainable supplier a higher proportion of available contracts (i.e., they made a more sustainable recommendation) compared to those managers operating under the business case cognition and narrow performance measurement goals.

This work contributes to the ongoing debate surrounding how sustainability activities can be theorized (Burritt & Schaltegger, 2014; Carter & Rogers, 2008; Seuring & Müller, 2008; Wong, Wong, & Boon-Itt, 2015). It also offers insights into the extent to which sustainable activities can be integrated into the structures of organizations via the type of performance measurement and reward systems used (Griffiths & Petrick, 2001; Hahn, et al., 2017; Yuan, Bao, & Verbeke, 2011). This paper also contributes to the boundary spanning aspects of theory building, by being one of the first empirical tests of paradox theory in a sustainability decision setting.

From the perspective of practice, this research contributes insights to supply chain sustainability management. Through its delineation of broad and narrow performance measurement archetypes, the results allow practitioners to glean further insights into the type of performance measurement systems that motivate purchasing managers to choose more sustainable suppliers. Such insights can be helpful since there are business consequences to the focal company for being associated with unsustainable supply chains including legal fines from laws such as CTSCA and the risk of consumer product boycotts (Hartmann & Moeller, 2014).

The remainder of the paper is organized as follows: the next section provides background information and introduces the theoretical constructs; the third section develops the hypotheses; the fourth section describes the research design and method; the fifth section presents the hypotheses testing. In section six, I present a discussion of the results along with general conclusions from this study.

Background and Theory

This research is uniquely situated at the intersection of multiple streams of literature: sustainable supply chain management (SSCM), managerial cognition, and performance measurement systems. Therefore, I dedicate this section to providing a fundamental understanding of these key concepts as I use them in this research project.

Sustainable Supply Chain Management

Conflicts among the dimensions of corporate sustainability oftentimes ‘‘represent the rule rather than the exception’’ (Hahn, Figge, Pinkse, & Preuss, 2010, p. 218). Yet amidst such tensions, managers need to make decisions which oftentimes entail potentially conflicting and ambiguous choices (Hahn et al., 2014). This conflict and ambiguity pervade all aspects of sustainability management, including the management of relationships with trading partners such as suppliers.

Researchers document that customers are holding companies responsible for all unsustainable behavior that occurs in the supply chain (Hartmann & Moeller, 2014, p. 281). This phenomenon makes sustainable supply chain management a critical aspect of business operations. Sustainable supply chain management (SSCM) is defined as the ‘‘management of material, information and capital flows as well as cooperation among the companies along the

supply chain while taking goals from all three dimensions of sustainable development i.e., economic, environmental and social into account which are derived from customers and the stakeholders' requirements''(Seuring & Müller, 2008, p. 1700). Consequently, understanding how a company approaches its sustainability practices in the supply chain is an important undertaking.

In their 2013 work, Gao and Bansal (2013) recommend an approach to incorporate sustainability that recognizes and embraces the contradictions among the three most discussed dimensions of corporate sustainability, namely: financial, social and environmental (p. 244). Adopting a paradoxical cognition has the potential to fulfill this call.

Managerial Cognition: business case and paradoxical framing

The second stream of literature relates to managerial cognition. In a recent Chartered Institute of Management Accountants (CIMA) survey, the researchers suggest that managers, and more specifically management accountants, functioning in the capacity of strategy-setters are integral to the corporate achievement of better sustainability outcomes (Collins, Lawrence, Roper, & Haar, 2011) and these strategic roles extend to management of supply chains. Managerial cognition is an important part of the decision-making process (Aguinis & Glavas, 2012).

To specifically theorize the sensemaking processes and the resulting decisions that sustainability managers engage in, Hahn et al. (2014) proposed two cognitive frames: *business case and paradoxical case*. According to Hahn et al. (2014), "the two frames are based on contrasting views of the relationship between the economic, environmental, and social dimensions of sustainability and result in different decision-making stances on sustainability issues" (p. 19). A paradoxical cognition, by definition, entails the recognition, comfort and embrace of paradoxes (Miron-Spektor, Ingram, Keller, Smith, & Lewis, 2014), where paradoxes

refer to contradictory yet interrelated demands that exist simultaneously and persist over time (Smith & Lewis, 2011). A business case cognition entails the alignment of social and environmental outcomes with financial performance (Hahn et al., 2014).

Hahn et al. (2014) propose that, on the one hand, managers in the business case frame prioritize the economic over environmental and social factors. That is, managers operating within the business case cognitive frame are posited to only interpret sustainability actions as good or bad while using an economic lens. On the other hand, those managers using a paradoxical frame are more cognitively aware of the potentially conflicting nature of sustainability, and so adopt a more "ambivalent" interpretation and practice related to sustainability issues.

Furthermore, the cognitive frame adopted is posited to affect a manager's stance and the action resulting from such a stance. According to Hahn et al. (2014), managers using the business case frame are likely to adopt a "pragmatic stance on sustainability issues, with a propensity to pursue narrow but workable responses along existing routines and solutions" (p. 15). Those managers using the paradoxical frame are posited to adopt a "prudent stance, where they consider more comprehensive responses, but because of their higher awareness of risk and tensions, they move forward slowly and carefully" (Hahn et al., 2014, p. 15).

In their purest form, these psychological cognitions, business and paradoxical case, anchor a continuum representing the range of sustainability related decisions managers make. According to Hahn et al. (2014), the continuum is anchored by a "full alignment with economic objectives at the one end and a combination of interrelated yet [potentially] conflicting economic, environmental, and social concerns at the other end" (p.23). The business case framing suggests a hierarchical evaluation of information with economic considerations constantly at the top. The paradoxical framing suggests a less hierarchical evaluation in which

any economic, environmental or social concerns may be elevated to primacy. As such, while managers in the business case frame consistently evaluate sustainability relative to the firm's economic profitability, those managers in the paradoxical frame evaluate sustainability on its own merits and not necessarily relative to the economic dimension and so sustainability and economics could be weighted equally or differently.

Performance Measurement Archetypes: broad versus narrow

The third stream of related research is the performance measurement systems literature. I focus on performance measurement systems (PMS) because of the increased attention to the possible behavioral impact of using different types of performance measures in contemporary organizational settings (Gunasekaran & Kobu, 2007). Such organizations are often characterized by their competitive global perspective and persistent demands for sustainability. In these organizations there is a shift away from narrow PMSs containing measures that are "internally focused, financial, and historically-based" towards the adoption of broad PMSs with measures that are more "externally focused, non-financial, and future-orientated" (Bouwens & Abernethy, 2000, p. 223). A rationale for this shift is the notion that the measures in a narrow PMS may be "too aggregated and too one dimensional to be useful because they are narrow in focus, historical in nature and incomplete" (Gunasekaran & Kobu, 2007; Lau & Sholihin, 2005, p. 390). Thus, financial measures alone may be insufficient to fully reflect an organizations' strategy.

To overcome the shortcomings of financial measures, nonfinancial measures, which include indicators related to customer perceptions, internal business process efficiency, and learning and growth perspectives are considered broader and tend to align better with organizations' long-term objectives (Kaplan & Atkinson, 1998). Ideally, both financial and

nonfinancial performance indicators should be designed to fit with the organizational structure, and goals of the organization (Virtanen, Tuomaala, & Pentti, 2013).

A PMS forms part of the larger management control system (MCS) of an organization and as such, the PMS plays an important role in directing behavior. Following Ferreira and Otley (2009), I view PMS as both formal and informal mechanisms, processes, systems, and networks. Such systems are used by "organizations for conveying the key objectives and goals elicited by management, for assisting the strategic process and ongoing management through analysis, planning, measurement, control, rewarding, and broadly managing performance, and for supporting and facilitating organizational learning and change" (p.264).

The objectives and goals outlined by a PMS are important because they help "direct attention and are often tied directly to the company's reward structure" (Fiolleau & Kaplan, 2016, p, 264). The PMS provides management of all levels with the information necessary for decision-making and actions. Since the PMS captures information to be used to help direct future actions, it is essential to measure the aspects of performance that reflect the strategy, values and mission of the organization, since according to Kaplan (1990), ''no measures, no improvement'' (p. 11). I dedicate a section under *hypotheses development* to review the theoretical base of broad versus narrow PMS as well as empirical findings in the literature related to these archetypes.

Hypotheses Development

Business Case and Paradoxical Cognitive Frames

Hahn et al. (2014) theorize the *business case* and *paradoxical framing* of sustainability decision-making around the decision makers' stance on the relationship among the economic, environmental, and social dimensions of sustainability. Their theory posits that managers operating under the *business case* frame consistently view the financial dimension as prominent,

while managers operating under the *paradoxical* frame do not consistently emphasize any single sustainability dimension over the others (Hahn et al., 2014).

In general, managers operating in the business case frame seek to reduce tensions and ambiguity. They achieve this goal by having a singular focus on the economic attributes of a decision. These managers "will make sense of ambiguous sustainability signals by applying a singular focus on financial results at the organizational level and a hierarchical emphasis of financial outcomes over environmental and social concerns" (Hahn et al., 2014, p. 22). This mental structure, which is essentially a single-focus mindset, is then expected to direct action such that information related to relationships between environmental and social aspects of a decision which do not align with economic objectives are ignored.

Juxtaposed to the business case frame is the paradoxical frame. Managers operating in this cognitive frame accept tension and embrace ambiguity. They achieve this goal by recognizing and accepting the contradictory nature of sustainability signals (Hahn et al., 2014). This mental structure is then expected to lead to comparatively higher degrees of differentiation and integration. In this mindset, the decision maker tends to take multiple pieces of potentially contradictory information into consideration before taking a stance on an issue (Hahn et al., 2014).

When paradoxical tensions are felt, Miron-Spektor et al. (2011) argue that organizational members draw on typical patterns of cognition, implicit assumptions, and prior experience to guide their response to the tension being experienced. Typically, organization members frame tensions as "either/or" as exemplified by the business case cognition, or "both/and" as is exemplified by the paradoxical cognition. In general, the cognitive frame which is activated will then influence which "cues organization members notice and extract, how they combine them

and create a more coherent interpretation of activity and act accordingly" (Sandberg & Tsoukas, 2011, pp. 16–17). Unlike the "either/or" framing, the "both/and" framing encourages cognitive juxtaposition of inconsistent demands (Miron-Spektor, Gino, & Argote, 2011, p. 230). The organization members' cognitive frame filters information and directs action (Sandberg & Tsoukas, 2011; Smith & Tushman, 2005).

Prior research emphasizes the importance of recognizing paradoxical tensions for improving performance, innovation, and leadership (Hahn, Preuss, Pinkse, & Figge, 2014; Ingram, Lewis, Barton, & Gartner, 2016; Lewis, 2000; Luscher & Lewis, 2008; Miron-Spektor & Erez, 2017; Smith, 2014) . Hence, when an organization member in a "both/and" frame experiences tensions and make sense of them, the paradoxical frame will serve as a mental template that helps them recognize and accept the simultaneous existence of contradictory demands (Smith & Tushman, 2005, p. 526).

Some empirical research outside of the accounting and sustainability context have engaged paradoxical frames in various situations. Empirical work in paradox and culture, such as Keller, Loewenstein, and Yan (2016), as well as action research conducted at the Danish Lego company by Lüscher and Lewis (2008), concluded that paradoxical frames can be socially constructed and affect decisions. Other empirical works motivated by paradox theory suggest that the paradoxical frame can be triggered by contextual and situational cues (Miron-Spektor & Argote, 2008; Miron-Spektor et al., 2011). Furthermore, Miron-Spektor et al. (2011) argue that paradoxical frames "can lead to increased individual creativity when they are activated without specific dimensions or criteria"(p. 233). Taken together, the theoretical and empirical work outside of the sustainability context suggests that paradoxical cognitive framing affects an

individual's judgments and decision-making in a variety of contexts (Keller, Loewenstein, & Yan, 2016; Miron-Spektor, Ingram, Keller, Smith, & Lewis, 2015).

Specifically related to the sustainability context, Hahn et al. (2014) theorize that once activated, a paradoxical frame allows individuals to think differently about interconnected yet potentially contradictory elements of sustainability and they may be better able to balance economic and non-economically driven sustainability-related factors; in essence, a "paradox perspective… regards environmental and social concerns as an end in themselves, not just as a means to the end of profit maximization" (Hahn, Figge, Pinkse, et al., 2017, p. 1). That is, paradoxical cognition is expected to lead to differences in decisions and actions when potentially conflicting features of a sustainable event or activity are present.

I examine paradoxical and business case framing within the supplier evaluation context as supplier evaluation is an initial step to integrating sustainability in the supply chain. Additionally, the purchasing managers who evaluate potential suppliers tend to gather and review multiple pieces of information from each supplier, yet the psychological aspects of their process have not received much attention in interdisciplinary research (Kull, Oke, & Dooley, 2014). In the context of this study, I expect differences in the evaluation produced by a purchasing manager who has adopted a paradoxical cognitive frame and is faced with potentially conflicting sustainability related information about suppliers relative to a purchasing manager who has adopted a business case cognitive frame. More specifically, I anticipate that the paradoxical cognitive frame can lead to heightened awareness of the potentially conflicting features of sustainability and this awareness leads to differences in the managers' decision making, such that they will tend to select more sustainable suppliers, even if their products are more costly. I formally state the following hypothesis:

H1 *Managers operating in a paradoxical cognitive frame will weight sustainability more heavily in their decisions than managers operating in a business case cognitive frame.*

Performance Measurement System Archetypes

As noted above, traditionally, performance measures have been mostly financial, thereby capturing financial ratios such as rate of return on investment and profit margins (Gunasekaran & Kobu 2006). Academic literature suggests that, in general, nonfinancial measures are better predictors of long-term financial performance than current financial measures (Banker, 2000). However, the academy has not reached a consensus concerning the types of performance measures that help to promote corporate sustainability.

In their review of the management accounting literature specifically focused on sustainability, Soderstrom, Soderstrom, and Stewart (2017) postulated that "it seems relatively straightforward that if [corporate sustainability] is related to more long-term behavior, that compensation incentives that are longer term should be positively related to [corporate sustainability] performance" (p.75). However, a review of the empirical studies in the domain returned inconsistent results. Using Kinder, Lydenberg, Domini and Co., Inc. (KLD) archival CSR data and equity incentives from EIRIS[6], Fabrizi et al. (2014) document a negative association between compensation and CSR performance. McGuire, Dow, and Argheyd (2003), and Manner (2010) reported no association, and Mahoney and Thorne (2005, 2006) found a marginally positive association between long-term compensation and corporate sustainability performance. This study extends these previous findings by adding a behavioral motivation and creating a unique organizational context to interpret these results.

[6] EIRIS specializes in the measurement of corporate social responsibility against a set of 5 criteria (employment, environment, community, human rights, and supply chain management). EIRIS data is principally used by investors (Fabrizi et al. 2014).

In a recent experiment using 41 accounting students and 34 practicing industry accountants in Canada, Fiolleau and Kaplan (2016) found that participants making decisions under broad (both financially and non-financially focused) performance goals were more sensitive to ethical issues than participants making decision under narrow (financially-focused) performance goals. Broad goals were operationalized as a combination of both financial and corporate social responsibility goals, while narrow goals were operationalized as only financial goals. The lower level of ethical sensitivity when a company's performance goals were narrow (financial only) was exhibited by both students and practicing accountants.

Theoretically, bounded rationality theory (Simon, 1957) and social cognition theory (Fiske & Taylor 1991) together suggest that due to the limited information processing ability of humans, our goals influence what information we attend to. Furthermore, Holmstrom (1979) theorizes that the "incentive problem" is primarily attributable to information asymmetry in supervisor-subordinate relationships (p.74). According to Holmstrom (1979), in lieu of full observation, multiple information signals may be used, even if those signals are imperfect. In the context of performance goals, provided the organization's and the manager's goals align, then the managers can be expected to primarily attend to the performance measures that earn them the greatest rewards.

Based on the above discussion, on the one hand, I anticipate that an organization that emphasizes financial returns only, via a narrow PMS, will signal the desire for corporate employees to primarily achieve these narrow financial targets and not necessarily focus on the sustainable aspects of their decision. On the other hand, I anticipate that an organization that emphasizes a broader set of performance criteria, via a broad PMS, will signal the desire for a

corporate employee to balance the achievement of financial goals and the sustainable aspects of the decision. This reasoning leads to the following hypotheses.

> ***H2:*** *The broader the scope of the performance measurement system, the greater the weight assigned to sustainable suppliers.*

The PMS in which managers operate affects the way they evaluate information. Therefore, I predict that the performance measurement system will moderate the relationship between the purchasing managers' cognitive frame and their evaluation and selection of the suppliers. Researchers view the paradoxical frame as a specific skill that managers use to embrace contradicting goals (Eranova & Prashantham, 2016). Broad performance goals can represent one such contradiction. The managers' pursuit of broad versus narrow performance goals offers a possible contextual factor to help those managers in the paradoxical frame achieve a level of sustainability that the financial focus in the narrow performance goal context does not. Relying on the theory and research evidence presented above, I argue that broad goals, support paradoxical thinking, while narrow goals support business case thinking. Therefore, I formally state the following hypothesis:

> **H3**: *Managers thinking paradoxically in an organization that utilizes a broad set of performance goals will place more weight on sustainability issues in supplier selection than managers thinking in a business case frame in an organization that utilizes narrow performance goals.*

Figure 1 graphically depicts the theoretical model for my hypotheses.

Experimental Design and Method

I test the above hypotheses experimentally via an online supplier selection task using managers from Amazon's Mechanical Turk (MTurk). I use a full-factorial 2 X 2 between-

subjects design with cognitive frames (business case versus paradox case) and performance measurement system (narrow versus broad) as independent variables. I manipulate the business case and paradoxical cognition by using a priming exercise adopted from Miron-Spektor et al. (2011). The participants viewed a picture of a toy that was designed to carry a small cup of water, without spilling the water, for 3.28 feet (1 meter). The toy had been entered into a contest and depending on the cognition being primed, the participants viewed comments from judges justifying their decision to select this toy as the winner. To manipulate narrow versus broad PMS I adopted case material from Fiolleau and Kaplan (2016) to match my setting. On the one hand, for participants in the narrow PMS condition, the case narrative describes a company that emphasizes meeting financial goals. On the other hand, for participants in the broad PMS condition, the case narrative describes a company that emphasizes meeting both financial and non-financial goals including sustainability.

Participants

I recruited participants (n =110) from Amazon's Mechanical Turk, an online platform that brings researchers and participants together and allow participants to complete online tasks for compensation. Prior research using MTurk workers, including accounting-focused studies, provides evidence that MTurk "offers a high-quality, low-cost participant pool for relatively demanding tasks that might otherwise be completed by traditional student participants or by nonaccounting experts" (Buchheit, Doxey, Pollard, & Stinson, 2018, p. 113).

To arrive at the sample size for this experiment an a priori power analysis was conducted based on an expected medium effect size. I conducted the analysis using G*Power (Faul, Erdfelder, Buchner, & Lang, 2009). Following suggestions from Buchheit et al. (2018) I used additional screening questions early in the study to "limit opportunistic behavior" and " avoid

late terminations or rejections" (p. 115). Therefore, through a combination of embedded and uniquely developed screening[7] questions set up on the MTurk platform, workers qualified to access the study material only if they were at least 18 years old, located in the United States, had at least 98% approval rate on their Human Intelligence Tasks (HITs), and had some management or purchasing experience. The study was available online for fourteen days, and in the end, 110 MTurk participants (39 females, 71 males; M_{age}= 35-54 years) completed this study in exchange for a fixed payment of $3.00. The amount paid to participants is considered reasonable since Buchheit et al. (2018) document that previous researchers are "paying MTurk participants $2.00 USD (or less) for 20-minute accounting tasks" (p. 114). Table 4 contains the descriptive statistics of the participant pool.

The final sample used for hypotheses testing consists of 87 participants (31 females, 56 males; M_{age}= 35-54 years). Eighty percent of the participants successfully passed the Statistical Package for Social Sciences (SPSS) outlier[8] analysis, manipulation and attention check[9] questions. The average completion time for the final sample was 23 minutes with completion time ranging from 14.98 minutes to 51.13 minutes. Participants are professional managers with approximately five years of work experience on average and approximately 37% report having more than five years' experience working in a professional purchasing capacity. Each participant was randomly assigned to one of the four experimental conditions.

[7] I requested the worker's unique MTurk ID in the screening stages of my instrument to ensure payment applications can be matched to completed responses. Do so also provided additional screening beyond IP address (Buchheit et al., 2018). Finally, I use the MTurk ID to block multiple attempts to complete the study after failing the initial screening.

[8] The outlier analysis was conducted based on completion time for all the participants and those who SPSS flagged as outliers were removed (n=8).

[9] 15 participants were eliminated due to failed manipulation (11) and attention check (4).

Experimental Task

The study consisted of three main parts: a priming task designed to manipulate the cognitive frames, a supplier evaluation task designed to assess the dependent measure, and a post experimental questionnaire. Appendix E and F contain the online instrument used in the experiment and the university's Institutional Review Board approval regarding that instrument.

After successfully passing the screener questions, participants complete a trait-based paradoxical thinking scale adopted from Miron-Spektor, Ingram, Keller, Smith, and Lewis, (2017). I measured trait-based paradoxical thinking as theory suggests some individuals are better able to think paradoxically than others. While random assignment should control for trait-based differences, I also measured them as a potential covariate since controlling for them is critical to my design.

Next, the participants engaged in a 45 second imagination task adopted from Miron-Spektor et al. (2011) designed to act as a distractor task between completing the trait-based paradoxical thinking scale and taking part in the cognitive priming task. The imagination task instructed participant to type into a text box as many uses of a brick that they could think of within the allotted timeframe. This task also helps to limit the use of artificial intelligence or robots, by requiring the participants to type their responses (Buchheit et al., 2018). During data cleaning, I examined the responses in this field and removed those with nonsensical syntax and repeated strings of nonsensical texts or links to websites and two such responses were [10]detected.

Next, participants were all exposed to information regarding a winning toy design. Information about this toy and the associated comments from the judges served as the first manipulation used to prime the business case versus paradox frame. Immediately after reading

[10] This number is include in the attention check number above.

the judges' comments, half of which were designed to prime paradoxical thinking and the other half of which were designed to prime business case thinking, the participants completed a scale to assess the effectiveness of the prime. Both the toy review and the effectiveness scale were adapted from case materials used in prior empirical work in psychology (Miron-Spektor et al., 2011).

Next, I instructed participants to assume the role of a purchasing manager for ABC Manufacturing Company and informed them that they were responsible for reviewing, evaluating, and making a recommendation to the VP of purchasing regarding potential suppliers. Each participant was given a narrative that ABC has a two-tiered supplier system that it uses to award contracts to suppliers: tier-one suppliers receives 65% of all fabric contracts and the tier-two suppliers receives the remaining 35%. I informed each participant that ABC's contract with the existing tier-one supplier will expire soon and the company's upper management team has asked him/her, the purchasing manager, to evaluate two new fabric suppliers.

I constructed the company information for ABC and the potential supplier based on similar information for large real-world companies operating in the manufacturing and fabric wholesale industries. To assist with construct and external validity, the development of the case material also involved a review by two academics in supply chain management, one in finance and four in accounting as well as three supply chain professionals. The instrument was also pilot tested using undergraduate and MBA students, who completed the study in exchange for extra class credit. The students also had the opportunity to leave comments on ways to improve the study. The review process and the pilot testing resulted in changes to the labeling of some scale items, the wording of some of the narrative, and the layout and general organization of the instrument.

After reading the case narrative, which contained their performance evaluation criteria, participants then viewed a summary of key performance data for the two potential fabric suppliers. The summary data was presented in tabular form and contained performance data related to: flexibility in changing existing orders; delivery ratings; price per yard of fabric; effectiveness of climate change policies; percentage of product line made with natural fibers; and percentage of product line made with locally grown fibers. With the supplier summary data still on the screen, participants were asked to make a recommendation, to the VP of purchasing, regarding what percentage of ABC's business should go to each supplier.

After making their recommendations, participants responded to a series of manipulation check questions designed to measure the salience of felt conflict around financial and sustainability performance and various financial and environmental factors on their recommendation. Participants then responded to two manipulation-check questions. Finally, participants provided demographic information. The experimental flow is graphically outlined in appendix E.

Independent Variables

Paradoxical and Business Case Cognitive Frames

I manipulated cognitive frames by using a priming task developed by Miron-Spektor et al. (2011). Participants view a photo of a winning toy product, The Twisting Slide, that they are told was designed by cross-functional teams as part of a team building exercise. Participants then read comments[11] from five judges providing their reasons for selecting that particular toy as the winner. The toy product was the same across conditions. However, several elements of the judges' comments were varied to create a paradoxical frame and a business case frame.

[11] Within treatment conditions, I randomized the order in which each participant viewed the judges' comments.

To simulate the *business case vs paradoxical cognition*, participants were primed using varying aspects of the criteria for winning the toy award that were emphasized in the judges' comments. On the one hand, to activate the *business case frame*, participants read comments from five judges that emphasized the cost efficiency of the winning toy. On the other hand, to activate the *paradoxical frame,* participants read comments from five judges that emphasized the difficulty in achieving both cost efficiency and creativity simultaneously in the winning toy. After reading the judges' comments, all participants responded to a six-item scale designed to evaluate the effectiveness of the prime. Appendix E contains the exact wording for each manipulation.

Broad vs Narrow Performance Goals

The manipulation of the performance evaluation archetypes broad vs narrow was included in the main case narrative with minor changes to represent each system type. Participants in the narrow condition were told that the company's performance evaluation system was oriented towards financial growth and used return on assets (ROA) as a metric on which managers were evaluated and rewarded. Under the narrow evaluation system, the case reads, in part:

- ABC's reward structure is primarily oriented towards meeting financial performance targets in order to maintain its growth and increase its return on assets (ROA).
- The focus on meeting financial targets permeates all levels of the organization.
- To illustrate, top management keeps a close eye on analysts' earnings expectations, relative to firm targets, and makes adjustments as necessary.
- Managers receive favorable performance evaluations and substantial bonuses for achieving these financial performance targets.

Participants in the broad condition were told that the company's evaluation system is oriented towards both financial and non-financial goals and hence uses both return on assets (ROA) and customers' expectations as a metric on which managers are evaluated and rewarded. Under the broad reward structure, the case reads, in part:

- While financial performance is emphasized to some degree in ABC's reward structure, non-financial performance in key strategic areas is very important.
- The focus on non-financial targets permeates all levels of the organization.
- To illustrate, top management keeps a close eye on customer satisfaction, relative to firm targets, to ensure customers' expectations for product quality are achieved.
- Managers receive favorable performance evaluations and substantial bonuses for achieving these non-financial performance targets.

Dependent Variable

The *dependent* variable is measured as the percentage of the firm's fabric contract the participant chooses to award to the more sustainable supplier. To capture this variable, I used two slider scales with values ranging from 0 to one hundred percent; one for the more sustainable and one for the less sustainable supplier. The participants are aware that the sum of the allocations they make must total one hundred percent and the participants were free to allocate ABC's fabric contract between the two suppliers in whatever percentage they deemed fit.

Results

Manipulation Checks

To assess the effectiveness of the cognitive framing manipulation, I asked participants to indicate their level of agreement with six statements using a 7-point scale (1 = strongly disagree,

7 = strongly agree). This six-statement paradox scale consists of two subscales and was adopted from Miron-Spektor et al. (2011). The first subscale captures the conflict between creativity and efficiency while the second subscale captures complementarity between these two dimensions. To evaluate whether the cognitive frame manipulation is successful, I take the difference between the average score on the conflict and complementarity subscales.

The conflict subscale asked participants to rate their degree of agreement with three statements on a fully labeled seven-point Likert scale where 1 = "strongly disagree" and 7 = "strongly agree". The scale consisted of the following items: [1] it is very difficult to generate novel prototypes that are also inexpensive; [2] saving costs when developing new products is almost impossible; and [3] the designers of the Twisting Slide invested in creativity but did not pay enough attention to cost restrictions. The complementarity subscale used the same seven scale labels and consisted of the following items: [1] the Twisting Slide is an example of a very creative product that is not too expensive; [2] compared to other products the Twisting Slide is economical and novel and [3] the designers of the Twisting Slide created a product that is both creative and affordable.

Factor analysis confirmed that the items loaded on two separate constructs, both with eigenvalues greater than one. The first construct, with an eigenvalue of 2.89, corresponded to the complementarity subscale (COM3) and explained 48.10% of the variance. This second construct, with an eigenvalue of 1.57, corresponded to the conflict subscale (CON3) and explained an additional 26.17% of the variance. However, I removed item [3], the designers of the Twisting Slide invested in creativity but did not pay enough attention to cost restrictions, from the conflict subscale due to cross loadings. Subsequent factor analysis reveals that the (COM3) subscale with eigenvalue of 2.603 now explains 52% of the variance, while the new (CON2) subscale accounts

for 29.5% of the variance on the data. The remaining two conflict scale items load together, with a Cronbach's alpha of 0.65, as do the three complementarity scale items, which return a Cronbach's alpha of 0.92.

As presented in Panel A of Table 5, the CON2 scores were slightly higher in the paradoxical frame (M = 4.269, SD = 0.171) than in the business case frame condition (M = 3.670, SD = 0.16). Panel A of Table 5 also revealed that the COM3 scores were lower in the paradoxical frame condition M = 5.750, SD = 0.153) than in the business case condition (M = 6.03, SD = 0.151). The results of the ANOVA, untabulated, show that the scores on COM3 ratings varied by condition, (F = 6.451, p = 0.006, one-tailed). Similarly, in untabulated results, the CON2 scores also varied by condition, (F = 1.742, p = 0.095, one-tailed). I evaluate the manipulation as effective because taken together the average of scores on both the conflict and complementarity scales was higher for participants in the paradoxical-frame condition.

To further measure the effectiveness of the cognitive manipulation, I took an additional step: I calculated the absolute difference between the new subscales (COM3 and CON2). I present descriptive statistics for participants' absolute difference scores on the cognitive framing manipulation in Panel A of Table 5. The scores were higher in the business case condition (M = 2.437, SD = 0.178) than in the paradoxical frame condition (M = 1.756, SD = 0.188). The results of the analysis of variance (ANOVA), tabulated in Panel B of Table 5 reveal that the absolute difference scores on the paradox scales varied by condition, (F = 6.876, p = 0.005, one-tailed). The higher means for the participants in the business case relative to those in the paradoxical were expected. The difference in the range of scores was expected to be lower based on the fact that the business case prime was designed to only activate thoughts on the efficiency dimension, while the paradoxical cognition was designed to activate both efficiency and creativity.

Therefore, the difference in the scores for participants primed to think on two dimensions, which is paradoxically, is expectedly lower than those primed to think on one dimension, that is business case. Taken together, as presented in Panels A and B of Table 5, the direction of the means and their statistical significance offer support for the effectiveness of the prime.

Two statements were used to assess the effectiveness of the performance evaluation manipulation. Using a 7-point scale (1 = strongly disagree, 7 = strongly agree), participants indicated their agreement with the following statements: "I was focused on the fact that my performance as a purchasing manager at ABC Company is evaluated mainly on meeting short-term financial targets" and "I was focused on the fact that my performance as a purchasing manager at ABC Company is evaluated on meeting long-term measures of non-financial performance". I expected participant in the broad evaluation condition to score above the mean on both questions while those in the narrow evaluation condition to score above the mean on question one and below the mean on question two. In the end, a total of twenty-three participants, representing twenty percent, were eliminated for failed manipulation and attention checks leaving a total of 87 responses used to test the three hypotheses. The failure rate was higher within the broad goals, 29% (18 participants), compared to the rate in the narrow goals, 10% (5 participants).

Tests of Hypotheses

Descriptive statistics

Table 6, Panel A presents reports cell sizes, means, and standard deviations for percentage of contract managers awarded to the more sustainable supplier across experimental conditions. Results reveal that the mean and standard deviation for percentage of fabric contract awarded to the more sustainable supplier in the paradoxical case with broad performance

measurement system case is 65.83 percent (SD = 28.80) and 37.33 percent (SD =17.96) in the paradoxical case with a narrow performance measurement system. Furthermore, of the demographic responses captured, only gender proved to be statistically significant (F = 2.795, p = 0.049, one-tailed) and it is therefore included as a covariate in the analysis below.

Hypothesis 1

H1 predicts that the manager's paradoxical and business case cognitive frame directly influences the percentage of the fabric contract awarded to the more sustainable supplier. Specifically, I predict that relative to their business case counterparts, the managers in the paradoxical cognitive frame will award a higher percentage of the company's fabric contract to the sustainable supplier. To test this hypothesis, I conduct an analysis of covariance (ANCOVA)[12] in which managerial cognition, business case vs. paradoxical case, serves as the independent variable. The dependent variable is the percentage of contract awarded to the sustainable supplier. Table 6 Panel B reports overall ANCOVA I performed to test H1 predictions statistically. Although in the predicted direction, the results indicate that the mean percentage of ABC's fabric contract awarded to the sustainable supplier (52.53) when the paradoxical cognition is primed is higher, but not statistically significantly different from the mean percentage (45.16) of ABC's fabric contract awarded to the same supplier when the business case cognition is primed (F = 1.309, p = 0.128, one-tailed).

Hypothesis 2

H2 makes predictions about the percentage of ABC's contract the managers will award based on the organizational PMS to which they are exposed. More specifically, H2 predicts that

[12] Due to its statistical significance, gender was included in the analysis. The results remain unchanged if this covariate is removed.

managers in an organization with broad PMS will award a higher percentage of ABC's fabric contract to the sustainable supplier relative to those managers in an organization with narrow PMS.

To test H2 predictions, I use the percentage of contract awarded to the sustainable supplier as my dependent variable. Table 6, Panel B presents the ANCOVA results. These results reveal a significant association between reward type and contract award ($F = 11.713$, $p = <0.001$, one-tailed), supporting H2. Consistent with H2, results show that managers operating under a broad performance evaluation system awarded a higher percentage of their company's contract to sustainable supplier than their peers operating under a narrow PMS

Hypothesis 3

The first two hypotheses were main effect predictions related to cognition and reward systems separately. H3 is a moderation hypothesis that suggests that the effect of the managers' cognition will be moderated by the nature of the performance evaluation system (broad versus narrow). Table 6, Panel B presents the ANCOVA results. I present the graph plotting the interaction in Figure 2. These results reveal a significant interaction between cognitive frame and PMS type on the proportion of the contract awarded to a sustainable supplier ($F = 4.312$, $p= 0.021$, one-tailed).

To further examine the significant interaction, I conducted simple effects tests. I present simple effects tests by condition in Table 6, Panel C. The results reveal that under a narrow PMS, managers in the paradoxical frame appear to place as much weight on the economics of the situation (i.e., they award less of the contract to the sustainable, but more expensive supplier) as those in the business case frame. On the other hand, when managers operating in the paradoxical frame are evaluated using a broader PMS, they award significantly more of the contract to the

sustainable suppler than those evaluated using a narrow PMS ($F = 5.183$, $p = 0.013$, one-tailed). In sum, the significant interaction observed in support of H3 is being driven by the broad PMS. When the PMS is narrow, its effect appears to over-ride any effects of the paradoxical cognitive frame.

Discussion and Conclusion

This study examines the effect of two managerial cognitive frames, specifically business case and paradoxical case, on the selection of a sustainable supplier given broad and narrow performance measurement systems. Theory developed by Hahn et al. (2014) posits that managerial decision-making in the corporate sustainability context varies depending on the managers' cognitive frames. According to Hahn et al. (2014), in the context of corporate sustainability, managers operating in a business case frame consistently view the financial dimension as prominent, while those managers operating in the paradoxical frame do not consistently emphasize any single sustainability dimension over the others (Hahn et al., 2014). Using this theory to motivate my hypotheses, I hypothesized that managers operating in a paradoxical cognitive frame will award a sustainable supplier a higher percentage of the corporations' contract relative to their counterparts in the business case cognitive frame. My results based on the online experimental setting do not find support for this hypothesis.

On the issue of performance measurement system that promote sustainable decisions, Soderstrom et al., (2017) provided mixed reviews on the organizational reward structures that better facilitate corporate sustainability. In this study, I hypothesize and find that managers rewarded using a broad PMS allocated more of the contract to the more sustainable supplier than those managers evaluated under a narrow PMS.

Importantly, I find a significant interaction between managerial cognitive frame and PMS type. This interaction offers insights into the combined effect of managerial cognition and reward type in the corporate sustainability setting. Managers who were primed to use "both/and" frame, typical of paradoxical cognition, and embedded in an organizational context characterized by broad goals exhibited a greater tendency to make more sustainable decision.

The paradoxical cognition does have an effect on sustainability decision-making, as evidenced by the interaction results. However, on its own the effect was not sufficiently strong for me to detect a main effect. The absence of a main effect could further suggest that the relationship between the paradoxical cognition and sustainability decision-making is possibly more nuanced than I presented and evaluated in this study.

This study contributes to our understanding of corporate sustainability decision-making in managerial accounting context. It is the first empirical study of which I am aware to apply paradox theory in a sustainability decision making context. In so doing, I juxtaposed paradoxical cognition against the dominant business case cognition to theorize managerial decision making in the area of corporate sustainability (Burritt & Schaltegger, 2014; Carter & Rogers, 2008; Seuring & Müller, 2008; Wong, Wong, & Boon-Itt, 2015). Through its use of contextual organizational factors, this research also offers insights into the extent to which managers may integrate sustainable activities into the organizational performance measurement and reward system (Griffiths & Petrick, 2001; Hahn, et al., 2017; Yuan, Bao, & Verbeke, 2011).

The results hold insights for practitioners, particularly management and other supply chain professionals. The results suggest that adopting a broad set of goals in the design of the performance measurement and reward system may serve to better motivate purchasing managers to select more sustainable suppliers, especially if these managers operate within a paradoxical

cognitive frame. These insights are important given there are business consequences to the focal company for being associated with unsustainable supply chains. Research shows that environmentally conscious consumers are willing to pay higher prices for environmentally friendly products (Guide et al., 2010; Atasu et al., 2010). These consumers are willing to take the risk of slowing economic growth for environmental protection (Elkington, 1994). Furthermore, unsustainable companies face other consequences including legal fines from laws such as California Transparency in Supply Chains Act (CTSCA) and the risk of consumer product boycott (Hartmann & Moeller, 2014, p. 281).

General Conclusion

Together, these two companion dissertation studies introduce paradox theory to the management accounting literature and offer empirical evidence for incorporating paradox theory as a lens to apply in this field of study. The first study reviews the extant literature on paradox theory in other non-accounting domains. Based on the reviewed literature, the tenants of paradox theory suggest that the concept of corporate sustainability is indeed paradoxical, and academia and practice could benefit from examining the concept as such. To this end, study I contributes to the management accounting literature by providing a set of theoretically grounded research questions as a starting point for scholars interested in applying paradox theory to corporate sustainability. Furthermore, study I introduces the theoretical concept of corporate sustainability temporal paradox- persistent, time-related tensions in corporate sustainability, as an extension of the current types of paradoxes. I conceptualize the sustainability temporal paradox as a meta-paradox that permeates the four other types of paradoxes. The corporate sustainability temporal paradox also offers multiple research opportunities.

Study II experimentally explores different managerial cognitions and contextual factors present in making sustainability related decisions. This study specifically asks two key questions: 1) "what effect do business case and paradoxical thinking have on the sustainability-related decisions of corporate managers?" and 2) "what qualities of performance measurement systems facilitate paradoxical thinking, and, in turn to the selection of a supplier?" The results of the study support the premise that managers operating in a paradoxical cognition and supported by a broad set of performance measures will make more sustainable decisions. Study II offers the first known empirical application of paradox theory in a managerial accounting setting and therefore contributes to the boundary spanning literature in the area of paradox theory.

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APPENDIX A: STUDY 1 FIGURES

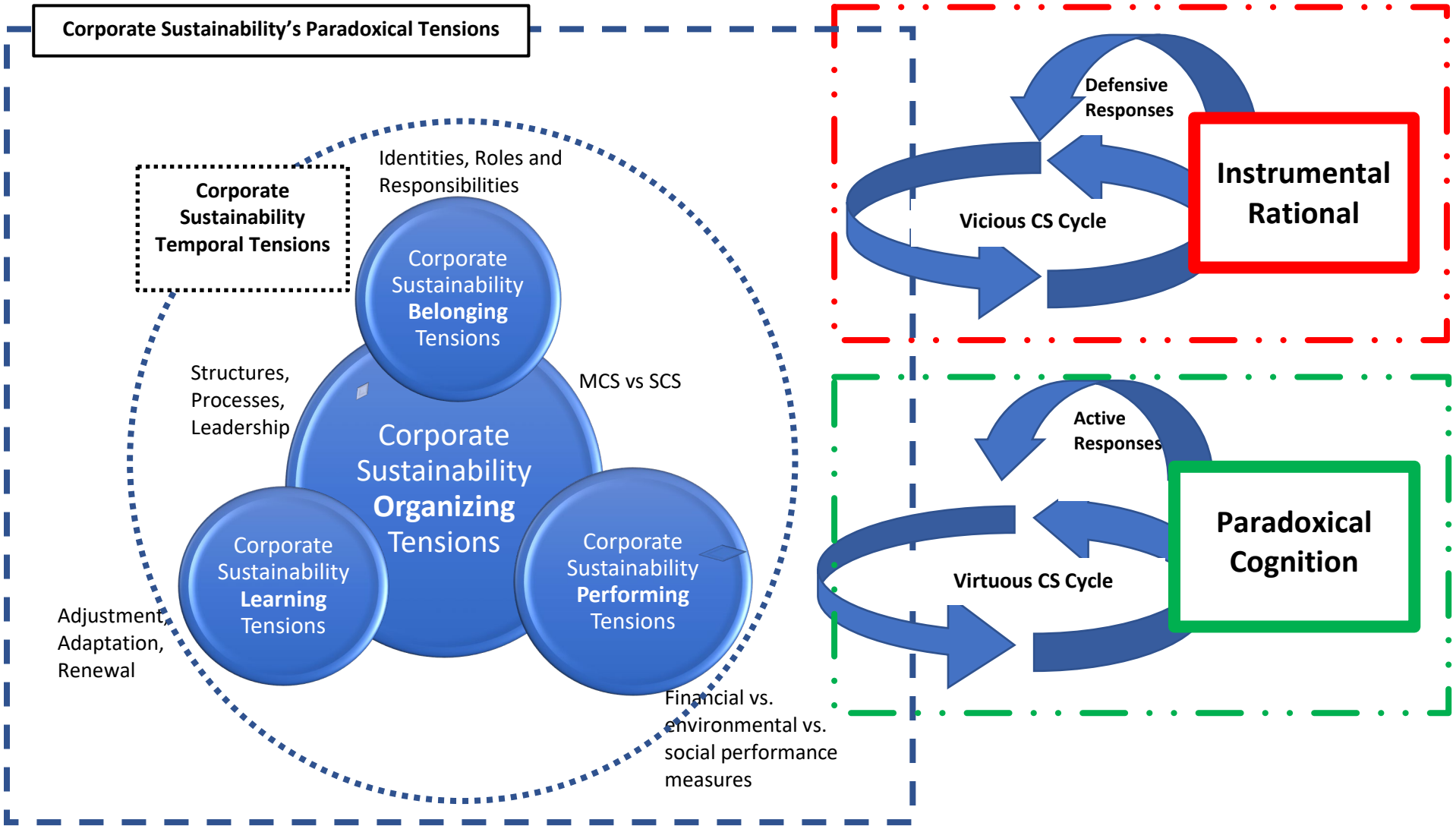


Figure 1: Current and Proposed Responses to Paradoxical Tensions in Corporate Sustainability

APPENDIX B: STUDY 1 TABLES

Table 1: Types of Paradoxes, Sources of Tension, and Examples

	CATEGORY OF PARADOXES			
	ORGANIZING	**PERFORMING**	**BELONGING**	**LEARNING**
Description	Structuring and leading foster collaboration and competition, empowerment and direction, and control and flexibility. Highlights the need for both stability and change (Smith & Lewis, 2011, p. 383)	Individuals within the organization are called upon to perform multiple and often inconsistent roles to fulfill their obligations to the organization (Lüscher & Lewis, 2008).	Tensions between an individual's values and beliefs relative to those of their referent group and the wider organization (Jarzabkowski et al., 2013)	Efforts to adjust, renew, change, and innovate foster tensions between building upon and destroying the past to create the future. (Smith & Lewis, 2011, p. 383)
Main Sources of Tension	Structures, Processes, Leadership	Competing Goals, Multiple measures of Success, Multiple measures to evaluate performance	Identities Roles Memberships	Adjustment Adaptation Renewal
Typical Examples of Paradoxes Linked to Each Category	Differentiation vs Integration *Empowerment vs.Control* Exploration vs Exploitation	Simplicity vs. Complexity Objectivity vs. Subjectivity Efficiency vs. Efficacy Quantitative vs. Qualitative	Integration vs. Separation Homogeneity vs. Heterogeneity Commitment vs. Indifference Affiliation vs. Independence	Certainty vs. Uncertainty Past vs. Future Stability vs. Change Predictability vs. Novelty
Typical Level of Analysis	Organizational-level	Micro-level	Meso-level	Micro-level

Table 2: Typical Responses to Paradoxes

Responses to Paradox	
Defensive ⟷ **Active**	
↕	
Source of Response: organization, team or individual	
Level of Tension Avoidance	
High ⟷ **Low**	
Splitting	Acceptance
Regression	Confrontation
Repression	Transcendence
Projection	
Reaction formation	
Ambivalence	

Table 3: Examples of Paradoxes in Management Accounting and Corporate Sustainability and Related Research Questions

	RESEARCH QUESTION BY CATEGORY OF PARADOXES			
	ORGANIZING	**PERFORMING**	**BELONGING**	**LEARNING**
Research Questions for Management Accounting and Sustainability	**RQ1:** How does the manager's cognitive frame affect the design, implementation and use of the MCSs in organizations pursuing corporate sustainability?			
	RQ2: How do managers use MCS to manage tensions between business case vs non-business case thinking?	**RQ4a:** What qualities of performance measurement systems facilitate paradoxical thinking and promote sustainability beyond the business case (social and environmental sustainability)?	**RQ5:** How are belonging tensions in corporate sustainability addressed (e.g., through defensive, active or some combination of these or other responses)?	**RQ6:** How does the paradoxically motivated reward system and cognitive frames of managers interact in a sustainable decision-making process?
	RQ3: What organizational arrangements best facilitate the manager's adoption of a paradoxical cognition?	**RQ4b:** Does the reward system vary with the dimension of corporate sustainability being promoted?	**RQ9:** How do the accountants' responses to belonging tensions in corporate sustainability ***coevolve over time*** (e.g., interaction between defensive, active or some combination of these responses)?	
	RQ7: What attributes of a MCS help promote sustainability in the ***short-, intermediate-, and long-terms*** ?	**RQ10:** What are the interactive effects of the paradoxically motivated reward system and cognitive frames, of managers, on sustainable decision-making process ***across multiple time frames*** ?		
	RQ8: How does the organizational arrangements that best facilitate the manager's adoption of a paradoxical cognition ***change with time*** ?			

APPENDIX C: STUDY 2 FIGURES

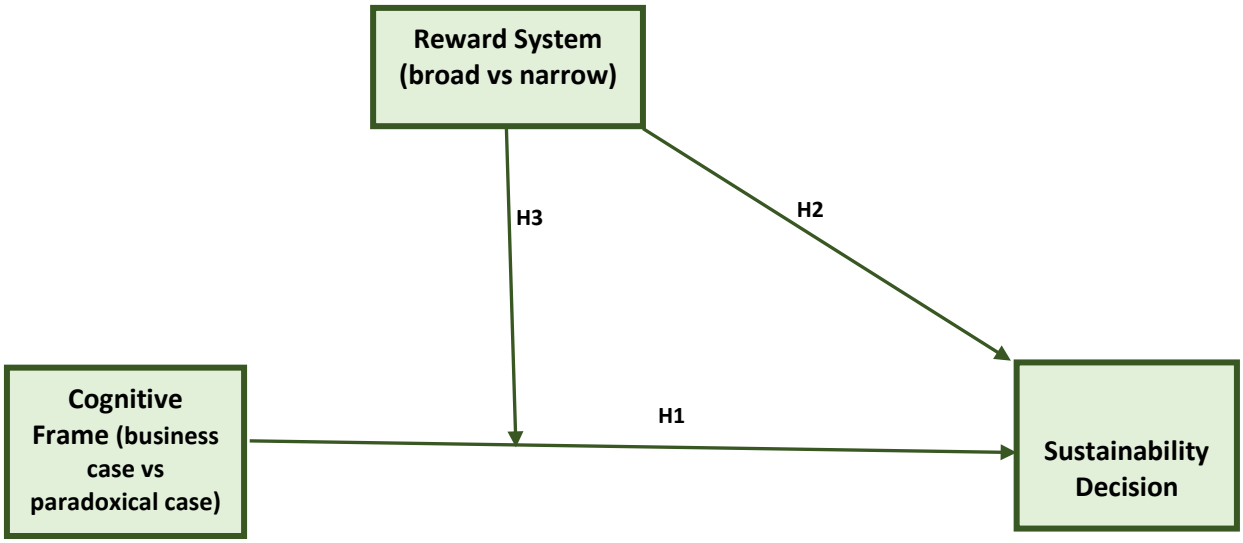


Figure 2: Conceptual Model

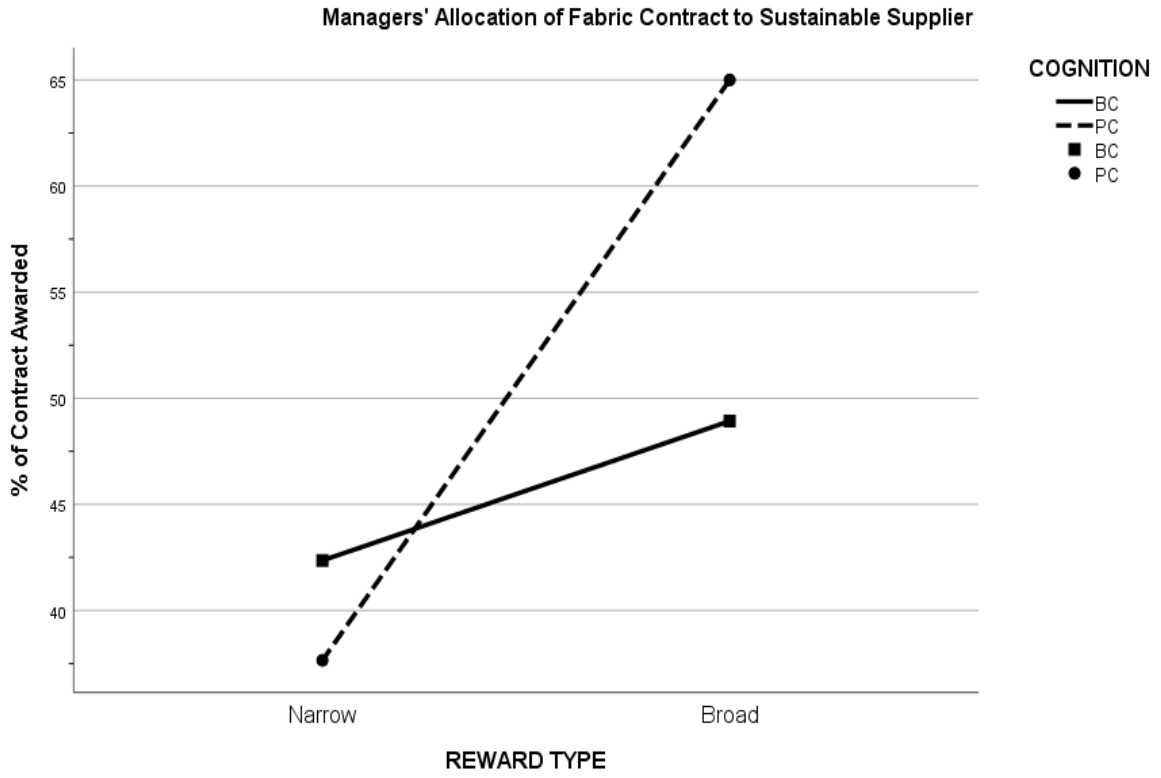
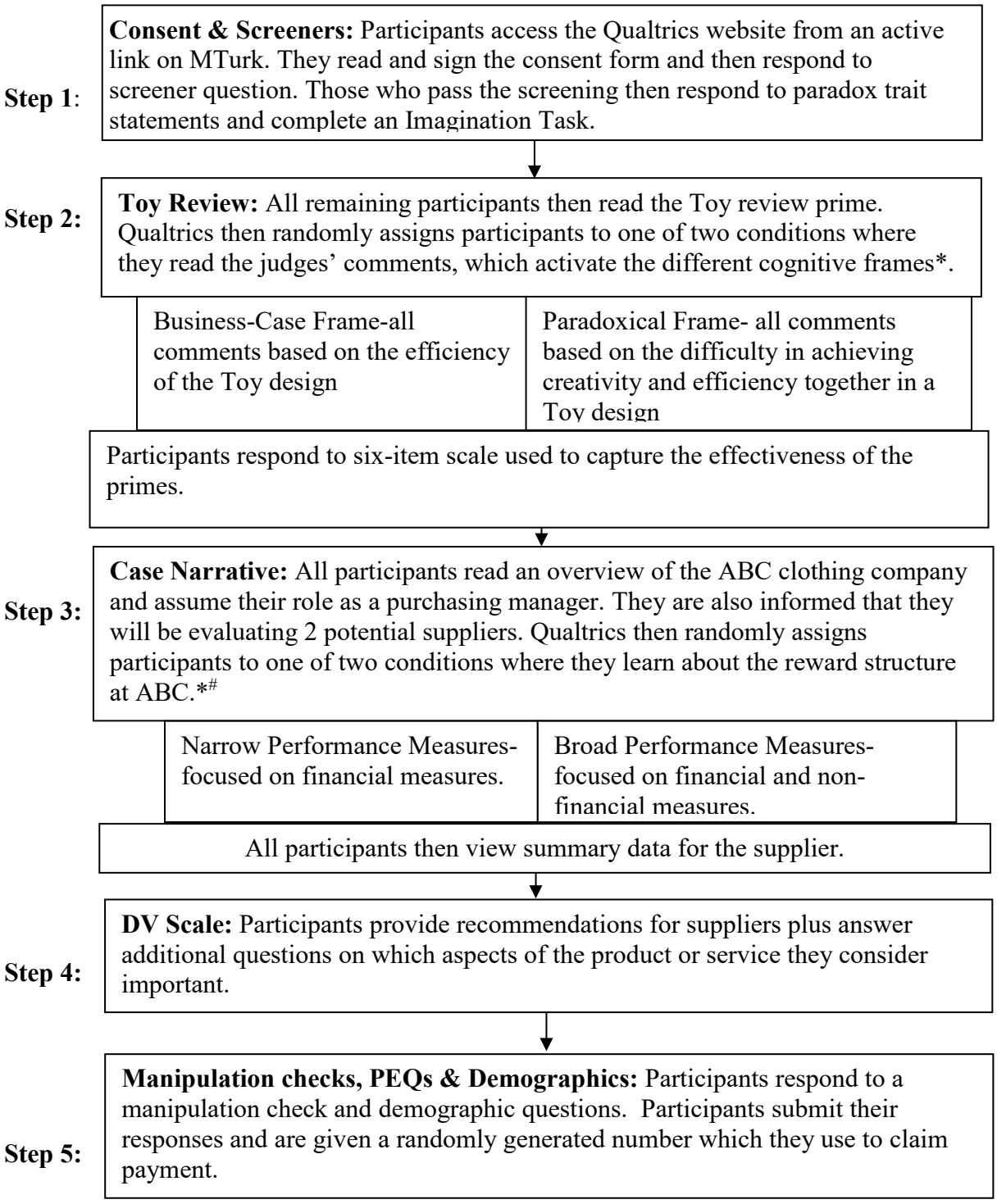


Figure 3: Results-Interaction Graph

APPENDIX D: STUDY 2 EXPERIMENTAL FLOW



*Review questions are included at this stage.
Comprehension questions are included at this stage.

APPENDIX E: STUDY 2 EXPERIMENTAL MATERIALS

Consent

Explanation of Research : You are being invited to take part in a research study being conducted by Nadra Pencle (Student) and Dr. Theresa Libby both of whom are affiliated with the University of Central Florida's Kenneth G. Dixon School of Accounting. Whether you take part is up to you. The purpose of this study is to explore how functional managers determine what information is relevant.

Study Qualification: To determine your eligibility, on the next screens you will be required to respond to some initial screening questions. If you do not meet the qualifications, then you will be asked to exit the study. Additionally, throughout the study you will be asked review questions to ensure that you understand the information provided in the study. It is important that you pay attention during the study because your compensation will be based on answering 80% of the review questions correctly.

Compensation: Upon successful completion of the study you will be compensated $3.00 via your MTurk account.

Study Overview: You will be asked to undertake an imagination task and read a product review for a toy. Next you will read some information which represents a scenario and then answer questions based on that scenario. Finally, you will be asked to respond to general demographic questions. You will be randomly assigned to one of four scenarios. The study will take about 20 minutes of your time and will be done via the internet. The responses provided are confidential. Only aggregated data will be included in any resulting publication or presentations. If you would like a copy of the results of the study, please send an email to me with your name and address and "results requested" and I will send you a copy of the results when they are available. You must be at least 18 years of age to participate in this study. Your participation in this study is voluntary.

Study contact for questions about the study or to report a problem: If you have questions, concerns, or complaints you may contact Nadra Pencle, PhD Student, Dixon School of Accounting, in the College of Business at (407) 823-6726 or by email at Nadra.Pencle@ucf.edu or Dr. Theresa Libby, Faculty Supervisor, Dixon School of Accounting, College of Business at Theresa. Libby@ucf.edu, or 407-823-4332 Dixon School of Accounting, College of Business.

IRB contact about your rights in the study or to report a complaint: Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review Board (UCF IRB). For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, Office of Research & Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246 or by telephone at (407) 823-2901.

By clicking below and continuing on to the following pages, you are indicating that you understand the above information and voluntarily consent to participate in the research. You are also affirming that you are at least 18 years of age.

Thank you very much for agreeing to participate. Thank you for agreeing to participate in our research. Before you begin, please note that the data you provide may be collected and used by Amazon as per its privacy agreement. This agreement shall be interpreted according to United States law.

screeners

Which of the following statements describe your work experience? Click all that apply:

- [ ] I had budget authority in my previous job
- [ ] I have budget authority in my current job
- [ ] I have experience in a professional setting
- [ ] I have experience in a management setting
- [ ] I have no management experience
- [ ] I have no budget experience in a professional setting

Page Break

In total, how many combined years of budgeting, professional or management experience do you have?

- ○ None
- ○ Under 1 year
- ○ 1-3 years
- ○ 3-5 Years
- ○ More than 5 years

Do you hold any professional designation related to purchasing and/or supply chain management?

- ○ Yes
- ○ No

Which purchasing and\or supply chain designation(s) do you hold?

_____

_____

_____

_____

_____

Page Break

Please enter you worker ID below:

_____

Thank you for your interest, however, based on your response, you do not appear to meet the qualifications required for this study. Please click next to exit the study.

Page Break

Trait Scale

On the scale below, please choose the number that best represents the extent to which the statements below describe you in a consistent way and over time. Note that there is no “right” or “wrong” answer.

	Strongly disagree 1	Disagree 2	Somewhat disagree 3	Neither agree nor disagree 4	Somewhat agree 5	Agree 6	Strongly agree 7
When I consider conflicting perspectives, I gain a better understanding of an issue.	○	○	○	○	○	○	○
I am comfortable dealing with conflicting demands at the same time.	○	○	○	○	○	○	○
Accepting contradictions is essential for my success.	○	○	○	○	○	○	○
Tension between ideas energize me.	○	○	○	○	○	○	○
I enjoy it when I manage to pursue contradictory goals.	○	○	○	○	○	○	○

I often experience myself as simultaneously embracing conflicting demands.	○	○	○	○	○	○	○
I am comfortable working on tasks that contradict each other.	○	○	○	○	○	○	○
I feel uplifted when I realize that two opposites can be true.	○	○	○	○	○	○	○
I feel energized when I manage to address contradictory issues.	○	○	○	○	○	○	○

Page Break

Thank you for answering these questions. On the next screen, you will begin an Imagination task. This activity simply requires that you think of multiple uses of an object and then type those uses within a given timeframe.

Imagination Task

Imagination Task Using the space provided below, please enter as many uses for a brick as you can think of. You will have at least 45seconds to complete this task.

Enter the uses for a brick below. (the button that enables you to move forward will appear after 45seconds have elapsed)

_____

_____

_____

_____

_____

Page Break

Thank you for completing the Imagination Task. Please click on "next" to begin the Toy Review.

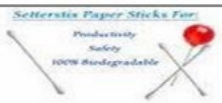
Page Break

Toy Review

Toy Review

"Forever Young Toys" is a small but highly successful company in the toy business. Forever Young Toys hosts an annual retreat where employees participate in group exercises to promote teamwork and comradery. The employees are never informed in advance what the exercise will be or what materials will be available for them to use. This year the employees were placed in cross-functional teams of four, given a variety of everyday items along with their prices, and instructed to build a prototype for a toy table-top-sized vehicle that could carry water across a short distance without spilling it.

are all items given to retreat participants this year

2 Clothespins **50 cents (each)**		2 Twist ties **30 cents (each)**	
4 Mini jumbo sticks **50 cents (each)**		2 Baking cups **50 cents (each)**	
1 Worksheet **$1 (each)**		4 Pipe cleaners **$1 (each)**	
2 Lollipop sticks **20 cents (each)**		2 Paper cups **$1 (each)**	
2 Paper clips **10 cents (each)**		Scotch tape **Free**	
		Glue **Free**	

Page Break

Expensive item review

Review Question: Based on the per unit cost of the items listed on the previous screen, please select all 3 **of the most expensive everyday items given to the teams.**

- ☐ Paper cups
- ☐ Worksheet
- ☐ Lollipop sticks
- ☐ Pipe cleaners
- ☐ Mini jumbo sticks

Oops you selected an incorrect item, deselect that item and please try again.

pic winning toy

2 paper cups ($1 each)

1 baking cup (50 cents)

2 lollipop sticks (40 cents)

1 pipe cleaner ($1each)

The judges' impressions and explanations for choosing the Twisting Slider are listed below:

"This product is very **inexpensive**. This is the most economical model that I have seen. I can tell that the designer carefully chose the materials to assure that the final product is not expensive."

"I think that using lollipop sticks as sliders is very **smart**. They are lighter and **less expensive** compared to the wood jumbo sticks that other designers used. Using the baking cups as the base is also very smart since they cost much less than other available materials."

“The designers of the Twisting Slider did a great job!! This is a wonderful example of a prototype that is **very inexpensive**!"

“The Twisting Slider addresses the requirements and it is **affordable**."

“This product is affordable. I especially like the idea of a vehicle that is a slide. Compared to other vehicles this model is easy to manufacture and **economical**.”

Page Break

Judge comments-paradox

The judges' impressions and explanations for choosing the Twisting Slider are listed below:

"The **most difficult** thing is to make the **usual unusual**...this product is **unique** and **efficiently** built. I haven't seen such a model before! I always like it when a designer surprises me. "

"I think that using lollipop sticks as sliders is **hard to accomplish but** also is very **smart**. They are lighter and **less expensive** compared to the wood jumbo sticks that other designers used. Using the baking cups as the base is also very smart since they cost much less than other available materials."

"The designers of the Twisting Slider did a great job!! This is a wonderful example for a very creative prototype that is also very inexpensive! Who said that creativity should cost a lot of money?"

"The Twisting Slider addresses the requirements well, it is **original and affordable**. Those are **difficult objectives** to achieve in a single Toy."

"This product is affordable and very aesthetic...**an unlikely combo**. Especially like the **breakthrough** idea of a vehicle that is a slide. Compared to other vehicles this model is easy to manufacture, it is very economical, and, at the same time, it is novel."

Scale for com vs coop

	Strongly disagree 1	Disagree 2	Somewhat disagree 3	Neither agree nor disagree 4	Somewhat agree 5	Agree 6	Strongly agree 7
It is very difficult to generate novel prototypes that are also inexpensive.	○	○	○	○	○	○	○
Saving costs when developing new products is almost impossible.	○	○	○	○	○	○	○
The designers of the Twisting Slide invested in creativity but did not pay enough attention to cost restrictions.	○	○	○	○	○	○	○
The Twisting Slide is an example of a very creative product that is not too expensive.	○	○	○	○	○	○	○

Compared to other products the Twisting Slide is economical and novel.	○	○	○	○	○	○	○
The designers of the Twisting Slide created a product that is both creative and affordable.	○	○	○	○	○	○	○

After reading the judges' comments about the prototype toy, please indicate your level of agreement with each of following statements. (1=Strongly disagree, 7=strongly agree). Note that there is no "right" or "wrong" answer.

Page Break

You have now completed this portion of the study, thank you! The next portion of the study requires that you take on the role of a **purchasing manager** for a large clothing manufacturer. It is **very important** that you read all the information very carefully as you will be required to pass a quiz on the details to ensure you have understood all of the information before you make any decisions.

Page Break

ABC Clothing Company Industry: Clothing manufacturer with operations in North America and Europe

Company strategy: To manufacture high-quality fashionable clothing in the medium-priced clothing segment

Your role: Purchasing Manager at ABC Company. You have been on the job 4 years.
Your task: To evaluate new suppliers of fabric based on the information provided on the next screens. As Purchasing Manager, you recently attended a Strategy and Planning meeting with the Vice- Presidents, the CEO and other managers at your same management level in the organization.

At that meeting**,** the CEO told everyone the Board of Directors has targeted an increase in overall return

on assets (ROA) of the company from 6% to 10% in 5 years' time. At the same meeting, the VP of also presented the results of a survey of ABC's key customers that revealed the following:

- customers are very interested in garments made from natural fibers.
- 80% of customers surveyed indicated that they would like ABC to "use more organic cotton" and "use less synthetic materials" in the garments they produce...because these fabrics are viewed as more environmentally-friendly "and "are produced by firms with more sustainable practices."
- 90 % of customers surveyed that understood that organic cotton and natural fibers cost more than synthetic materials.
- the majority of customers surveyed are not willing to pay much more for these products. The CEO told everyone at the meeting that he wanted this information to be considered when making decisions over the course of the next year.

Shortly you will learn about the way your performance is evaluated as a Purchasing Manager at ABC

Company.

Page Break

Review Question: What is your role at ABC Company?

- ○ Purchasing Manager
- ○ VP of Marketing
- ○ CEO
- ○ Budget Manager

Page Break

Broad goals

Your performance as purchasing manager of ABC Company will be evaluated as follows:

- While financial performance is emphasized to some degree in ABC's reward structure,**non-financial performance** in key strategic areas is **very** important.
- The focus on-financial targets permeates all levels of the organization.
- To illustrate, top management keeps a close eye on customer satisfaction, relative to firm target, to ensure customers' expectations for product quality are achieved.
- Managers receive **favorable performance evaluations and substantial bonuses for achieving these non-financial performance targets.**

Page Break

narrow goals

Your performance as purchasing manager of ABC Company will be evaluated as follows:

- ABC's reward structure is primarily oriented towards meeting **financial performance** targets in order to maintain its growth and increase its return on assets (ROA).
- The focus on meeting financial targets permeates all levels of the organization.
- To illustrate, top management keeps a close eye on analysts' earnings expectations, relative to firm targets, and makes adjustments as necessary.
- Managers receive **favorable performance evaluations and substantial bonuses for achieving these financial performance targets**.

Page Break

Review Questions: Please respond to the following questions, which are based specifically on the information provided in the case that you have just read:

The Board of ABC Company has set a target to increase Return on Assets (ROA) over the next 5 years from:

- ○ 5% to 8%
- ○ 6% to 10%
- ○ 3% to 5%
- ○ 2% to 7%

Question 1 is incorrect, please select another answer. *Recall that in the meeting today you learned that your Board of Directors has targeted an increase in overall return on assets (ROA) of the company from 6% to 10% in 5 years' time.*

The survey discussed by the VP of Marketing revealed that ABC's customers would like to buy garments:

- ○ With more organic cotton and less synthetic materials
- ○ That are designed primarily for men
- ○ That are more durable for children
- ○ That have more snaps and Velcro rather than buttons and zippers

---

Question 2 is incorrect, please select another answer. *Recall that in the meeting today you learned that the marketing survey suggests that ABC's customers would like to buy garments with more organic cotton and less synthetic materials at current prices*.

A standard part of your job as a purchasing manager is to evaluate potential fabric suppliers and you report directly to the VP of Purchasing. The firm has a 2-tiered preferred supplier system that it uses to award contracts to its suppliers. ABC awards 65% of all fabric contracts to tier-one supplier(s) and the remaining 35% of fabric contracts goes to tier-two supplier(s). Contract with a current, tier-one cotton supplier, Dice Supplier Inc., will expire soon. ABC does not have the option to renew its contract with Dice Supplier Inc., because Dice has decided to focus on producing fabrics for other industries. Astier-one supplier, Dice Supplier Inc. is currently awarded up to 65% of all fabric orders that ABC Inc. places. Today, you will be evaluating <u>two</u> suppliers to potentially replace Dice Supplier Inc. Given the survey results provided at the Strategy and Planning meeting, you have decided to include the suppliers' ability to provide more fabrics made from natural fibers into your evaluation. In addition, you plan to evaluate the suppliers' recent investments in environmental and sustainability initiatives while also considering the cost of the fabrics that can be supplied by these companies.

Your task: to the VP ofhow much of ABC's business should be allocated to each supplier. You may choose to allocate all of the business to one supplier or share the business between the two.

Review Question

How many potential suppliers will you be evaluating today?

- ○ 1
- ○ 2
- ○ 3

Page Break

To help you with the task of evaluating potential fabric suppliers, your team has compiled and provided you with a short-list of potential suppliers. The suppliers on this list have met initial screening criteria so they are financially stable, profitable, publicly-traded companies located in the US. In addition, your staff has compiled the following data from the individual bids from the suppliers and other reports produced by a reputable independent trade association:

The summary data is displayed next:

Page Break

Summary Data for Supplier

Supplier Performance Matrices	2017 Industry Averages	Current Supplier- Dice Supplier Inc	Potential Supplier A	Potential Supplier B
Flexibility in changing orders once they are placed (Max 5, Min 0)	**4**	4	4	4
On-time delivery ratings (Max 5, Min 0)	**3.7**	3.7	3.7	3.7
Average price per yard of fabric (U.S. $)	**$ 7.26**	$ 7.40	$ 7.11	$10.89
Climate change policies and performance (Max 100, Min 0)	**85**	85.9	80.8	92.7
% of product line made from natural fibers (Max 100, Min 0)	**45.5**	46	44.6	69.2
% of fabric made from locally grown fibers (Max 100, Min 0)	**56**	56.6	54.9	85.1

DV % to A & B

Using the slider bars below, please indicate the percentage of ABC's Tier-One fabric contract (currently purchased from Dice Supplier Inc.) that you would recommend purchasing from each of potential suppliers A and B. You may select any percentage between 0 (no fabric will be purchased from this

supplier) to 100 (all the fabric will be purchased from this supplier), but the sum of the two amounts chosen must add to 100%

_____ Supplier **A**

_____ Supplier **B**

Importance of factors

Please indicate the <u>importance</u> of each of the factors below to your previous allocation decision. Using a scale rating from1 to where 1= Not at all Important and 7= Extremely Important

	Not at all Important 1	Very Unimportant 2	Somewhat Unimportant 3	Neither Important nor Unimportant 4	Somewhat Important 5	Important 6	Extremely Important 7
Efficiency	○	○	○	○	○	○	○
Low cost per yard of fabric	○	○	○	○	○	○	○
Environmental sustainability	○	○	○	○	○	○	○
Product line content of natural and/or	○	○	○	○	○	○	○

locally grown

fibers

Page Break

Now, imagine that you were told that both Supplier A and Supplier B ***could*** become Tier 1 suppliers and the VP now needs you to suggest the percentage of ABC's fabric contract to award to each supplier. Please use the slider below to indicate your response.

_____ Supplier **A**

_____ Supplier **B**

PEQs

This is the final section. This contains general questions about the case you just reviewed as well as some demographic questions about you. Please read and answer all the questions carefully.

Page Break

To what extent do you agree with the each of the following statements? In making my previous supplier related decisions:

	Strongly disagree 1	Disagree 2	Somewhat disagree 3	Neither agree nor disagree 4	Somewhat agree 5	Agree 6	Strongly agree 7
I was focused on the fact that my performance as a purchasing manager at ABC Company is evaluated mainly on meeting short-term financial targets	○	○	○	○	○	○	○

I was focused on the fact that my performance as a purchasing manager at ABC Company is evaluated on meeting long-term measures of non-financial performance	○	○	○	○	○	○	○

Page Break

Considering your supplier-related decisions you made earlier, please specify the degree to which you agree with the following statements (1= Strongly Disagree, 7= Strongly Agree).

	Strongly disagree 1	Disagree 2	Somewhat disagree 3	Neither agree nor disagree 4	Somewhat agree 5	Agree 6	Strongly agree 7
I am clear about the best way to allocate ABC's fabric contract to each of the suppliers.	○	○	○	○	○	○	○
I feel sure about the percentages of ABCs contract I allocated to each of the supplier.	○	○	○	○	○	○	○
The supplier-related decisions were easy for me.	○	○	○	○	○	○	○

I know the effects on ABC of each supplier option.	○	○	○	○	○	○	○

Page Break

Do you hold any professional designation related to purchasing and/or supply chain management?

- ○ Yes
- ○ No

Which purchasing and\or supply chain designation(s) do you hold?

_____

_____

_____

_____

How much years, of, supply chain, management do you have?

- ○ None
- ○ 1 - 3 years
- ○ 5 - 6 years
- ○ More than 6 years

- ○ None

To which industry is your purchasing or supply chain management experience related?

- ○ Hospitality
- ○ Industrial Goods
- ○ Education
- ○ Energy
- ○ Retail
- ○ Agriculture
- ○ Other _____

In total, how many combined of budgeting, professional or management experience do you have?

- ○ None
- ○ Under 1 year
- ○ 1-3 years
- ○ 3-5 years
- ○ More than 5 years

Page Break

How old are you?

- ○ 18-25
- ○ 26-34
- ○ 35-54
- ○ 55-64
- ○ 65 or over _____
- ○ Prefer not to answer

What is your gender?

- ○ Male
- ○ Female
- ○ Prefer not to answer

Page Break

What is the highest level of education you have completed?

- ○ High School / GED
- ○ 2-year College Degree
- ○ 4-year College Degree
- ○ Masters Degree
- ○ Professional Degree (JD, MD)
- ○ Doctoral
- ○ Other _____

Page Break

Which major best matches your level of education?

- ○ Accounting
- ○ Medicine
- ○ Arts
- ○ Finance
- ○ Tax
- ○ Marketing
- ○ Engineering
- ○ Real Estate
- ○ Hospitality
- ○ Law
- ○ Other _____

Were you born in the United States?

- ○ Yes
- ○ No

How many years have you lived in the United States?

- ○ 0-3 years
- ○ 4-6 years
- ○ 6-9 years
- ○ over 9 years

Is English your first language?

- ○ Yes
- ○ No

How many years have you spoken English?

- ○ 0-3 years
- ○ 4-6 years
- ○ 6-9 years
- ○ over 9 years

What is your race?

- ○ White/Caucasian
- ○ African American
- ○ Hispanic
- ○ Asian

- ○ Native American
- ○ Pacific Islander
- ○ Other _____
- ○ Prefer not to answer

APPENDIX F: IRB APPROVAL

EXEMPTION DETERMINATION

January 15, 2019

Dear Nadra Pencle:

On 1/15/2019, the IRB determined the following submission to be human subjects research that is exempt from regulation:

Type of Review:	Initial Study, Category
Title:	Managerial Sensemaking: The Cognitive Effects of Business Case and Paradoxical Framing on Perception of Sustainability
Investigator:	Nadra Pencle
IRB ID:	STUDY00000079
Funding:	None
Grant ID:	None

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made, and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request so that IRB records will be accurate.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Sincerely,

Adrienne Showman

Designated Reviewer

APPENDIX G: STUDY 2 TABLES

Table 4: Demographics of Participants

TABLE 4

Demographics		**n=110**	
		n	**%**
AGE	18-25	6	5%
	26-34	25	23%
	35-54	64	58%
	55-64	12	11%
	65 or over	2	2%
	Prefer not to answer	1	1%
GENDER	Female	39	35%
	Male	71	65%
RACE	White/Caucasian	96	87%
	African American	6	5%
	Hispanic	5	5%
	Native American	1	1%
	Other	2	2%
EDUCATION	High School / GED	21	19%
	2-year College Degree	16	15%
	4-year College Degree	58	53%
	Masters Degree	11	10%
	Professional Degree (JD, MD)	2	2%
	Doctoral	1	1%
	Other	1	1%
MAJOR	Accounting	10	9%
	Medicine	2	2%
	Arts	10	9%
	Finance	20	18%
	Tax	2	2%
	Marketing	11	10%
	Engineering	13	12%
	Real Estate	1	1%
	Hospitality	1	1%
	Law	4	4%
	Other	36	33%

Table 4: Demographics of Participants Cont'd

Demographics		n=110	
YRS of PROF. MANAGEMENT EXPERIENCE	Under 1 year	2	2%
	1-3 years	18	16%
	3-5 years	18	16%
	More than 5 years	72	65%
YRS of PURCHASING EXPERIENCE	None	18	16%
	1 - 3 years	27	25%
	5 - 6 years	22	20%
	More than 6 years	43	39%
INDUSTRY	Hospitality	11	10%
	Industrial Goods	19	17%
	Education	5	5%
	Energy	2	2%
	Retail	36	33%
	Agriculture	10	9%
	Other	27	25%

Table 5: Test for Effect of Cognitive Framing Manipulation

TABLE 5

Test for Effect of Cognitive Framing Manipulation

Panel A: Descriptive Statistics

	Business Case			Paradoxical Case		
	n	**Mean**	**S.D**	**n**	**Mean**	**S.D**
Conflict (CON2)	58	3.67	0.16	52	4.27	0.17
Complementarity (COM3)	58	6.03	0.15	52	5.75	0.15
Scores on Paradox Scale	58	2.44	0.18	52	1.76	0.19

Panel B: ANOVA Model of Scores on Paradox Scale

Source of Variation	**d.f.**	**Mean Square**	**F-statistic**	**p-value[a]**
Cognitive frame	1	12.692	6.876	0.005
Error	108	1.846		

[a]One-tailed equivalent given directional predictions.

Variable definitions:

Scores on CON2 and COM3 are aggregate values on Conflict and Complementarity scale used to measure a dimension of paradoxical cognition.

Scores on Paradox Scale represent the absolute difference in the mean of the CON2 and COM3 subscales.

Cognitive frame is the participant's mental frame induced through the priming narrative; either business case or paradoxical.

Table 6: Test of Hypotheses

TABLE 6

Test of H1, H2 and H3

Allocation of Fabric Contract to Sustainable Supplier

Panel A: Descriptive Statistics - Means (standard deviation)

	Cognition		
PMS Type	Business Case	Paradoxical Case	Total
Broad	48.00 (19.44) n = 20	65.83 (28.80) n = 24	57.73 (26.30) n = 44
Narrow	42.59 (24.26) n = 22	37.33 (17.96) n = 21	40.02 (21.33) n = 43
Total	45.17 (22.00) n = 42	52.53 (28.05) n = 45	

TABLE 6 Cont'd

Allocation of Fabric Contract to Sustainable Supplier

Panel B: ANCOVA Model of Allocation of Fabric Contract to Sustainable Supplier

Source of Variation	d.f.	Mean Square	F-statistic	p-value[a]
Cognitive frame – ***H1***	1	695.794	1.309	0.128
PMS Type – ***H2***	1	6226.814	11.713	<0.001
Cognitive frame * PMS Type – ***H3***	1	2292.180	4.312	0.021
Gender	1	1486.013	2.795	0.049
Error	82	531.600		

Allocation of Fabric Contract to Sustainable Supplier

Panel C:Tests of Simple Effects for Allocation of Fabric Contract to Sustainable Supplier

Source of Variation	d.f.	Mean Square	F-statistic	p-value[a]
Effect of Cognitive frame given Narrow Goals	1	237.320	0.446	0.253
Effect of Cognitive frame given Broad Goals	1	2755.454	5.183	0.013

[a]One-tailed equivalent given directional predictions

Variable definitions:

Allocation of Fabric Contract to Sustainable Supplier is the percentage of ABCs contract the participants' award to the sustainable supplier.

Cognitive frame is the participants' mental frame induced through the priming narrative – either business case or paradoxical.