



**REVISITING COOPETITION DYNAMICS: IMPLICATIONS FOR
OPPORTUNISM AND VALUE CREATION WHEN FIRMS
COMPETE AND COOPERATE SIMULTANEOUSLY**

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Abstract

Referring to simultaneous competition and cooperation between firms, coopetition is emerging in practice as a promising source of value creation. However, the scholarly literature is dominated by a widespread assumption that opportunism, a core behavioral assumption of transaction cost economics, hinders value creation and requires formal safeguards in coopetition. The assumption of heightened opportunism in coopetition is at odds with rising adoption in practice, which often proceeds without formal safeguards. This raises concerns about the utility of existing theory for explaining coopetition dynamics and their implications for value creation.

Building from theories of competitive dynamics and the resource-based view, my research challenges the dominant assumption of heightened opportunism and develops an alternative explanation to better explain coopetition dynamics. I identify and test *informal market-based safeguards* which reduce opportunism in coopetition. This provides theoretical resolution for conflicting findings in the literature and develops a nuanced understanding of the factors affecting opportunism in coopetition at multiple levels. It addresses the failure of extant research to explain coopetition dynamics and establishes foundations for systematic analysis of coopetition benefits and costs in future research.

For managers, my findings move beyond simplistic perceptions that have emphasized instability, knowledge leakage, and the resultant need for formal safeguards in coopetition. Instead, I identify an efficient and effective alternative for constraining opportunism. This indicates that establishing, maintaining, and ultimately achieving value creation in coopetition relationships may be less challenging and costly than the literature

assumes. Given the benefits of competition for both firms and society, this has important economy-level implications.

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“If I have seen farther, it is by standing on the shoulders of giants.”

– Isaac Newton

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Chapter 1: Introduction and Theoretical Background

1.1 Introduction

The focus of this dissertation is on expanding knowledge of coopetition dynamics and explaining their role in determining value creation in coopetition. Coopetition refers to the phenomenon of simultaneous competition and cooperation between firms (Bengtsson & Kock, 2000; Gnyawali & Park, 2009: 2011). The study of coopetition has emerged from the interplay of the literatures on inter-firm competition (Barney, 1991; Chen, Smith, & Grimm, 1992; Porter, 1980), with roots in industrial organization economics (Bain, 1956; Mason, 1939) and Austrian economics (Kirzner, 1973; Mises, 1949), and inter-firm cooperation (Contractor & Lorange, 1988; Dyer & Singh, 1998; Hamel, 1991), originating in sociology (Granovetter, 1985; Macaulay, 1963). Coopetition is receiving an increasing level of scrutiny in the academic literature (Ansari, Garud, & Kumaraswamy, 2016; Gnyawali & Park, 2011; Ketchen, Snow, & Hoover, 2004), but in its current state there are important limitations that must be addressed.

With its basis in transaction cost economics (Coase, 1937; Williamson, 1975), a widespread assumption in the coopetition literature is that heightened opportunism leads to significant costs and challenges (Dussauge, Garrette, & Mitchell, 2000; Park & Russo, 1996; Park & Ungson, 2001). Acknowledging this dominant view, my research seeks to expand on knowledge of opportunism in light of increasing pursuit of competition in industry (Gnyawali & Park, 2009; Harbison & Pekar, 1998), which often proceeds without formal safeguards to constrain opportunism (Ryu & Reuer, 2016). In addition, by

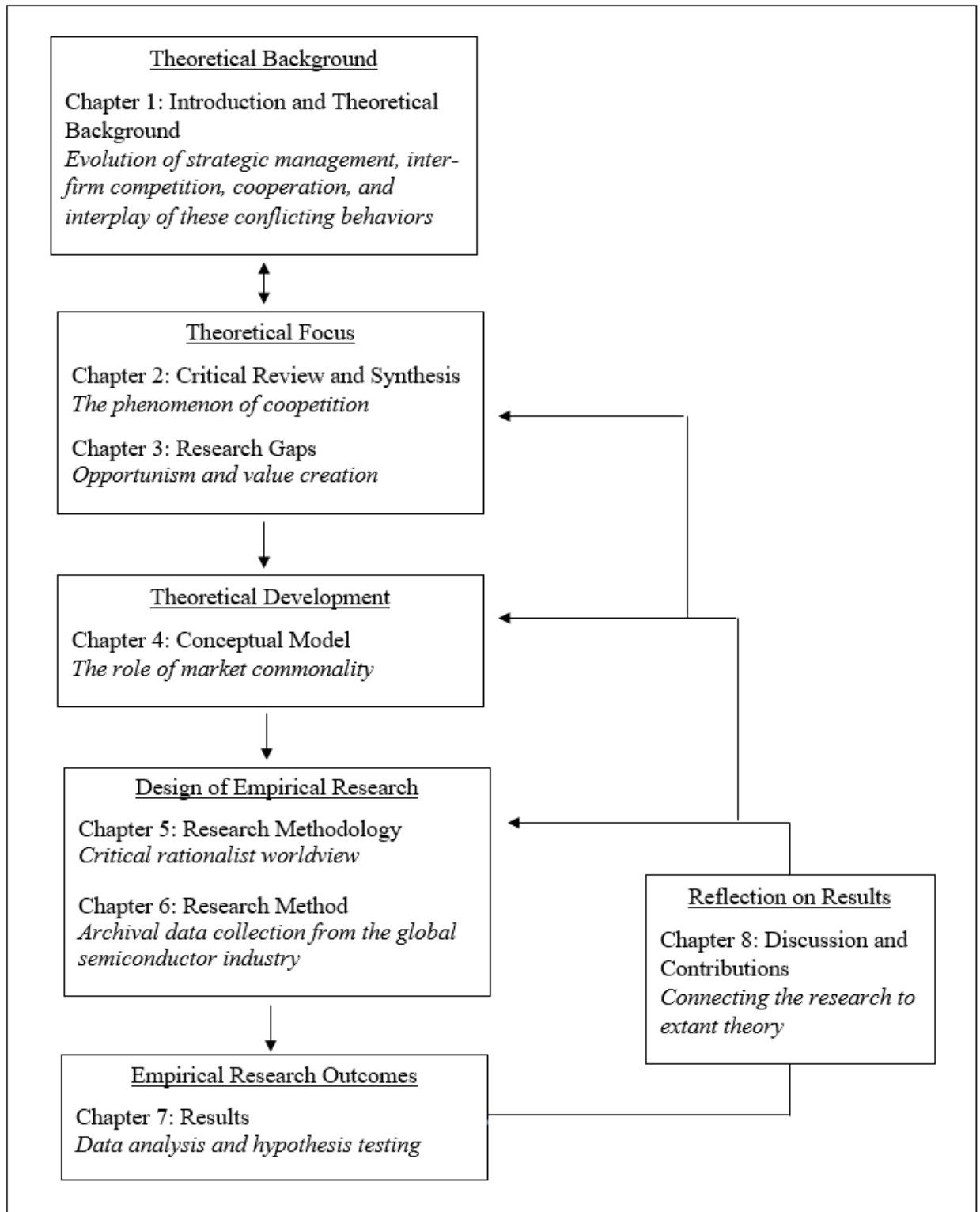
connecting opportunism to firm value creation in coopetition, I intend to clarify how firms achieve widely reported benefits from coopetition (Ansari et al., 2016; Bengtsson & Kock, 2000; Gnyawali & Park, 2011) given the perceived challenges of opportunism.

My dissertation will address the limitations in the literature by explicating the role of market commonality in coopetition — a core determinant of opportunism —, unpacking its effect on opportunism in coopetition, and examining the subsequent influence on firm value creation. The overarching contribution of my research is to clarify the nature of opportunism in coopetition. This advances theoretical development by challenging the dominant assumption in the literature, illuminating previously unreported informal market-based safeguards against opportunism in coopetition, and reconciling conflicting findings.

1.2 Research process

To formulate this contribution to knowledge, my dissertation relies on both theory and data. Figure 1.1 lays out the framework employed to manage the relationship between theory and data (Rose, 1982). It illuminates a deductive approach, starting with theory before moving to data and then returning to theory. I will now outline the research process I followed, before explaining how this maps onto the dissertation structure.

Figure 1.1: Research process



*adapted from Rose (1982)

My research is grounded in a critical review of extant theory. It began with a synthesis of the broad theoretical background, which moves from the evolution of strategic management research to the role of inter-firm competition and cooperation, to the interplay of both firm behaviors. The interplay of competition and cooperation leads to the emergence of coopetition, a phenomenon that has received increasing but fragmented scrutiny in the literature. From an extensive analysis, I isolated three defining characteristics of coopetition and explicated several implications of coopetition that enable value creation benefits for firms. I then unpacked two important research gaps in the literature: failure of extant theory to explain opportunism in coopetition and, as a result, constrained theoretical development regarding value creation in coopetition. These led me to develop two specific objectives for the dissertation, which map onto two research questions. To answer the research questions, I advanced five hypothesis which built on theory from competitive dynamics (Chen, 1996; Chen & MacMillan, 1992; Gimeno & Woo, 1996a) and the resource-based view (Barney, 1991; Lavie, 2006). With careful reflection regarding the opportunities and challenges associated with moving from theory to data, I identified critical rationalism as a suitable methodology for the specified objectives. The decision regarding methodology bore important implications for research method and, after consideration, I identified a quasi-experimental design employing archival data from the global semiconductor industry as an appropriate method. The conceptual model was operationalized and the resultant empirical model was tested. The estimates from the empirical model were then used for hypothesis testing. Next, returning to theory, I reflected on the outcomes of hypothesis testing in terms of the empirical design, theoretical development, focal theory, and theoretical background. This led to

three core contributions, broader advancements of the competition literature, and extensions of underpinning theories. In addition, I identified practical implications, and a number of limitations and future opportunities arising from my research.

1.3 Dissertation structure

In the remainder of Chapter 1, I explain personal motivations and aims for this research. I then review how the strategic management literature has evolved to examine the phenomenon of competition, which is the focus of my dissertation. I begin with the positioning school of strategic management research (Porter, 1980), which is informed by industrial organization economics (Bain, 1956; Mason, 1939). As the field developed, and to address limitations of the positioning school in dynamic environments, emphasis shifted to analysis of the firm's internal resources (Barney, 1991; Wernerfelt, 1984) and capabilities (Teece, Pisano, & Shuen, 1997). This ultimately led to recognition that firms may not be able to satisfy resource and capability requirements internally, and that the firm may access critical resources from its external relationships (Dyer & Singh, 1998; Lavie, 2006). Two conflicting behaviors are observed in this evolution of strategic management: inter-firm competition and inter-firm cooperation. I explain how the competitive dynamics literature (Baum & Korn, 1996; Chen et al., 1992) builds from Austrian economics (Jacobsen, 1992; Mises, 1949) to explain firm competitive behavior. Inter-firm competition is understood through the concept of market commonality: the proportion of the firm's markets in which it encounters a given competitor (Chen, 1996). Inter-firm cooperation has its roots in sociology (Granovetter, 1985; Macauley, 1963), where firms may access resources and capabilities through their relationships with one another (Gnyawali & Madhavan, 2001; Gulati, 1998). I conclude by reviewing three

different views on the interplay between inter-firm competition and cooperation: the networks view, the contextual view, and the dyadic view. The networks view emphasizes competitors who are connected by cooperative relationships in a network (Andreovski & Ferrier, forthcoming; Gnyawali, He, & Madhavan, 2006; Sanou, Le Roy, & Gnyawali, 2016). The contextual view studies how the firm may benefit from maintaining some competitive relations and some cooperative relations (Brandenburger & Nalebuff, 1996; Bresser, 1988; Lado, Boyd, & Hanlon, 1997). The dyadic view is the focus of this dissertation and emphasizes simultaneous competition and cooperation between the same two firms (Bengtsson & Kock, 2000; Gnyawali & Park, 2009: 2011).

Chapter 2 focuses on the dyadic view of the interplay between competition and cooperation, from which the phenomenon of coopetition emerges. Coopetition is receiving increased scrutiny in the literature (Ketchen et al., 2004), which generates intriguing opportunities but also raises challenges regarding the boundaries of coopetition and factors that enable value creation in coopetition (Bengtsson & Raza-Ullah, 2016; Gnyawali & Song, 2016; Ketchen et al., 2004). To explain the opportunities and address some of the challenges, Chapter 2 reports the findings of a critical review and synthesis of the focal literature on coopetition. I begin by the organizing the literature through four lenses that have been utilized to study coopetition: actor-centric, interaction-centric, cognition-centric, and context-centric. Each lens has a unique take on the phenomenon and, in combination, they provide a holistic overview of how coopetition has been studied. To address ambiguity regarding the boundaries and definition of coopetition, I next develop three defining characteristics that characterize the phenomenon under study and distinguish it from related phenomena. These characteristics, simultaneity of competition

and cooperation, the paradoxical interdependence of competition and cooperation, and value creation intent in coopetition, offer much needed clarity concerning how coopetition is understood and examined. Building on Chapter 1, I then explicate core implications of inter-firm competition and cooperation. Inter-firm competition leads to pursuit of excellence and resource potential between firms, whereas inter-firm cooperation generates relational mechanisms and resource commitments. These implications each offer benefits and challenges, but I explain that under certain conditions they may be complementary when they co-exist simultaneously. When competition and cooperation are balanced and moderately strong, I explain how the synergies generated between these sets of implications may enable value creation in coopetition.

In Chapter 3, I explain the current state of the literature and the underpinning theory that leads to the two research gaps that my dissertation will address. Though Chapter 2 portrays quite a promising view of value creation in coopetition, the widespread view in the literature is significantly more skeptical, dominated by an assumption of heightened opportunism. The concept of opportunism, referring to self-interest seeking with guile (e.g., lying, cheating, stealing, or evading obligations), originates from transaction cost economics (Coase, 1937; Williamson, 1975). I explain why opportunism is assumed to be heightened in coopetition (Dussauge et al., 2000; Park & Russo, 1996; Park & Ungson, 2001) because firms are (1) motivated to behave opportunistically, (2) capable of behaving opportunistically, while (3) simultaneous inter-firm competition and cooperation also introduces additional uncertainty to the relationship, which is conducive to opportunism. However, I note how this view is at odds with rising pursuit of coopetition (Harbison & Pekar, 1998; Gnyawali & Park, 2009), which often proceeds without formal

safeguards to constrain opportunism (Ryu & Reuer, 2016). This raises concerns about the usefulness of existing theory for explaining the dynamics of coopetition. As a result, two research gaps emerge. The first gap is the failure of extant research to explain coopetition dynamics, which leads to the second gap, constrained theoretical development regarding value creation in coopetition. These gaps motivate two research objectives: (1) to develop better theory regarding opportunism and (2) to explore the implications of opportunism in coopetition for value creation in coopetition. The research objectives map onto two research questions that this dissertation will address.

Chapter 4 begins the process of answering the research questions by advancing a conceptual model regarding opportunism and value creation in coopetition. This chapter builds on two theories, competitive dynamics (Chen et al., 1992; Baum & Korn, 1996; Smith, Grimm, & Gannon, 1992) and the resource-based view (Barney, 1991; Lavie, 2006), which are central to inter-firm competition and cooperation but have been largely overlooked to explain coopetition dynamics. I begin by explaining the concepts of competitive action and response in competitive dynamics and how the potential competitive response determines the likelihood that a competitive action will proceed (Chen et al., 1992; Chen & MacMillan, 1992). This logic may be applied to scope for partner retaliation to opportunism, which I argue can reduce opportunism in coopetition. I explain why market commonality in coopetition increases scope for partner retaliation, which reduces opportunism in coopetition. Market commonality establishes a base level of awareness of opportunism and motivation to retaliate, while it increases capability to retaliate. This suggests a negative effect of market commonality on opportunism but, extending the conceptual development to the resource-based view, I propose that this

effect will reverse at high levels of market commonality. When market commonality is high firms must appropriate value from many of the same markets, which reduces the rarity of jointly developed resources and increases rewards from behaving opportunistically. Consequently, I hypothesize a curvilinear, U-shaped effect of market commonality on opportunism, where low and moderate levels of market commonality are negatively associated with firm opportunism but this reverses at higher levels of market commonality. I next consider the effect on value creation, which I predict is negatively affected by opportunism. This motivates a hypothesized inverted U-shaped relationship between market commonality and value creation. To validate the logic underlying these predictions and enable fine-grained analysis, I also introduce two additional constructs, market rivalry and repeated cooperation, which are predicted to have important negative moderating effects on the main relationship.

In Chapter 5, I outline important methodological decisions made in relation to ontology, epistemology, and approach to reasoning. These decisions cumulatively set the research in the context of a critical rationalist worldview, consisting of a realist ontology, falsificationist epistemology, and deductive approach to reasoning. I begin by explaining why philosophy is an important consideration and the burden of responsibility to adopt and express a methodological stance. This is followed by a discussion of ontology, which outlines the prominent standpoints of objectivism and subjectivism in the literature, before explaining the suitability of a cautious realist position for the current research. Cautious realism acknowledges that an external, concrete reality does exist, but recognizes that sensual limitations and the interpretive nature of observation impedes our ability to know it directly (Blaikie, 2007). I proceed to outline epistemological considerations, where

prominent assumptions associated with positivism and interpretivism are discussed, and the suitability of a falsificationist position is explained. Falsificationism recognizes that the interpretive nature of observation makes ‘proof’ or ‘truth’ unachievable, so the goal is to challenge and falsify hypotheses and arrive at a point where theory is ‘less bad’ (Popper, 1959: 1972). The final methodological decision is approach to reasoning, where I outline traditional deductive and inductive approaches, and explain why deductivism is aligned with my ontological and epistemological choices. The central assumptions of a critical rationalist worldview are then discussed, before I reflect on the implications of research methodology for the subsequent choice of method.

Chapter 6 outlines the details of my research method. Though an experimental approach is most appropriate for the type of positivistic worldview adopted, practical and ethical conditions lead me to rely on a quasi-experimental design employing third-party archival data. The global semiconductor industry is a highly suitable empirical context because of its dynamic inter-firm competition and cooperation. Data was collected from firms involved in dyadic cooperative R&D agreements from 1995-2010 from SDC Platinum, the Center for Research in Security Prices (CRSP) database, Compustat, SEC filings, Factiva, and Lexis Nexis. I then outline the decisions made during the collection process, generating a final sample of 464 firm observations. I proceed to explain the empirical measures that are derived to measure the core constructs: *Value Creation*, *Market Commonality*, *Opportunism*, *Market Rivalry*, and *Repeated Cooperation*. I then highlight the control variables that are relevant for opportunism and value creation, before concluding with a reflection on the outcomes of the pilot study.

In Chapter 7, I describe the processes and outcomes from testing the empirical model. I begin by reporting descriptive statistics and pairwise correlations, before discussing the results of the event study method to measure value creation. From the results of the event study, I observe an overall positive effect of cooperation on value creation. However, moving to the results of the *Value Creation* model, I find insufficient to support the hypothesized negative effect of opportunism on value creation and, by extension, the hypothesized inverted U-shaped effect of market commonality on value creation. Turning to the *Opportunism* model, I find evidence to support all three hypothesized effects: the curvilinear U-shaped effect of market commonality on opportunism, the negative moderating effect of market rivalry, and the negative moderating effect of repeated cooperation. These findings uphold a curvilinear U-shaped effect of market commonality on opportunism in cooperation which is weakened by market rivalry and repeated cooperation. Through a variety of postestimation procedures, I find that my results are resistant to common sources of bias.

Chapter 8 moves from data back to theory and considers the empirical findings in light of existing research. I begin by summarizing the results with respect to the research questions. Although cooperation has a broadly positive effect on value creation, the hypothesized effects of opportunism and market commonality on value creation are not supported. I then turn to the effects on opportunism where all three hypotheses are supported. This leads to three core contributions. First, I identify and test informal-market based safeguards against opportunism. This challenges a widespread assumption that opportunism is heightened in cooperation and advances theory about the dynamics of cooperation. Second, I provide theoretical resolution for the conflicting findings in the

literature regarding market commonality and opportunism. By establishing both a negative and positive effect as part of the curvilinear relationship, I explain both conflicting perspectives in the literature within a rounded theoretical analysis. Third, my clarification of key moderators provides a more nuanced understanding of the main relationship and affirms the underlying logic whereby increased scope for partner retaliation is the basis for informal market-based safeguards in coopetition. I proceed to explain how my research advances the wider coopetition literature by establishing conceptual boundaries for coopetition, identifying limitations of the event study method for measuring value creation, and enhancing understanding of how value creation occurs in coopetition. I also identify promising extensions arising from my research for both theories at the heart of coopetition, competitive dynamics and the resource-based view. I emphasize the important practical implications for firm participation in coopetition, associated societal benefits, and managerial decisions regarding governance and partner selection. The dissertation concludes by highlighting limitations of the research and avenues for future research.

1.4 Motivations

I found the opportunity to pursue a PhD compelling for two reasons. One was the satisfaction I had achieved from my experience of academic research to date. I saw the PhD as a chance to pursue research at a much deeper level and anticipated that the process, as well as the outcome, could be a source of satisfaction. The other reason was the sheer scale of the challenge arising from the long and arduous path that a PhD requires. As I endeavored to find the limits of my field, I anticipated that I may also find the limits of myself, which could generate many opportunities for skill development and growth.

My first exposure to independent research came as a final year Bachelors student (Business Administration: Equine) at the National University of Ireland, Maynooth in 2013/14. The research-orientated nature of the final year curriculum was highly complementary to my own personal desire to perform well, and together they enabled a stimulating and highly productive year. As the pace of the program began to accelerate, the emphasis shifted from structured lectures to student-led discussions based on primary research. This coincided with a change in my own circumstances: money saved during a one-year international work placement in 2012/13 relieved me of the need to work full-time during my final year and enabled me to focus entirely on my studies. As the year progressed, I found a natural curiosity for research and an inclination towards deeper understanding of firm behavior and strategy. The opportunity to pursue such inclinations on a full-time basis was not lost on me and I tried to achieve as much from this time as I could. I might have expected the associated hard work to be accompanied by a degree of stress or anguish but, to the contrary, I found the process quite enjoyable. Each day offered a chance to peel back another layer of a particular problem and deepen my understanding of the discipline. A self-perpetuating cycle emerged – better research efforts led to new insights while new insights incentivized better research efforts.

My final year culminated with a Capstone Research Project, where much of the second semester was dedicated to academic research. My project applied microeconomic principles to Irish Thoroughbred racehorse owners – a core stakeholder group in the equine industry. Highlighting the importance of owners' prospects for the industry's survival and growth, I identified a number of promising opportunities for owners to improve their collective positioning. It was the first time I was responsible for delivering

a literature review, formulating research questions, collecting and analyzing data, and articulating contributions. I found great satisfaction in the iterative, messy, and ‘back-n-forth’ nature of research design and execution. At the same time, I observed how my research might make an impact when my thesis generated two peer-reviewed conference papers and a national newspaper feature.

These experiences from my Bachelors degree motivated my decision to pursue a PhD because I felt I could generate the same enjoyment and satisfaction from the research process, but at a deeper level. The scale and rigor required for a PhD research is undoubtedly greater than any undergraduate equivalent, but the processes are similar. (Quite rightly) I did not anticipate the PhD experience to be entirely without stress, but on the whole, the stimulation and consistent challenge of independent research was something I expected to enjoy. Thus, one reason I chose to pursue a PhD was because I expected to find the process of research satisfying and enjoyable – and not just the outcomes.

In addition, I recognized that a PhD offered opportunities for broadly applicable skill development. I do not recall a clear post-PhD ‘career plan’ at the time, but I do remember identifying many transferrable skills that I would hone in the process. These included communication, solving difficult problems, and deconstructing and reconstructing arguments as new information was presented. Such skills are highly valued within and beyond academia. I hoped that the skills acquired through the PhD would stand to me in whatever career direction I ultimately chose to pursue.

I was also motivated by the sheer scale of the PhD, which I viewed as a source of growth. Accounts from those who had gone before – both in success and failure – were united in agreement that a PhD is an extremely difficult goal. Becoming an expert and ultimately developing a new contribution requires much trial and error, unforeseen challenges, and setbacks. An expert is sometimes described as somebody who has made all the mistakes that can be made in a very narrow field and, although stumbling from mistake to mistake is not easy, much growth occurs in the process. As Marcus Aurelius noted in *Meditations*:

“The impediment to action advances action.

What stands in the way becomes the way.”

I believed the tests presented by a PhD would be a source of improvement that could make the journey rewarding, as well as the outcomes. I felt that a difficult goal, like a PhD, and the process of trying, failing, and trying again, would, by itself, help me to grow and become a better researcher and person.

The first seeds of my dissertation topic were sewn during a one-year work placement for the third year of my Bachelors degree, where I was first exposed to benefits of simultaneous competition and cooperation. I achieved a highly sought-after placement at Lane’s End Farm in Lexington, Kentucky, one of the largest Thoroughbred stud farms in the world. Lexington is often labelled ‘the horse capital of the world’ and the surrounding area is packed full of Thoroughbred industry participants at various stages of the value chain.

During my placement, I observed how Lane's End sustained a large number of mutually beneficial collaborations with smaller farms in the area. While the farms competed ferociously for boarding contracts and stallion nominations, they frequently cooperated to sell their horses under the Lane's End brand. Lane's End was synonymous with top quality stock and I saw first-hand the success of this approach when leading the team looking after two of the top four lots from the 2013 Keeneland November Breeding Stock Sale: Awesome Maria (sold for \$4m) and Broadways Alibi (sold for \$2.1m).

The relationship between the smaller farms and Lane's End was mutually beneficial because it offered the smaller farms a greater level of status and visibility for their stock, while the quality of the stock enhanced Lane's End's reputation and the farm appropriated commissions in each case. Through sponsorship and the donation of land and other resources, Lane's End fortified these bonds by embedding themselves in many local activities. This simultaneous competition and cooperation between the farms was a source of their survival and growth, enabling them to secure a key source of employment in a rural area. Though I did not know it as 'coopetition' at the time, these observations in Kentucky were my first exposure to the potential benefits of this intriguing phenomenon of simultaneous competition and cooperation.

This dissertation focuses on the dynamics of simultaneous competition and cooperation. This emerged as a key issue during my initial analysis of the literature which led to the formulation of a PhD proposal. As I reviewed extant research, it quickly became clear that simultaneous competition and cooperation had received some attention in the strategy literature. Often labelled 'coopetition', some research highlighted certain benefits that had been achieved. Yet there was limited explanation of *how* such benefits were achieved. I

will demonstrate in the following chapters that such explanation is fundamental to how the wider phenomenon is theorized. This led me to use my PhD to address this important topic by attempting to shed new light on the dynamics that enable firms to achieve benefits in cooptation.

1.5 Aims of the research

A natural narrowing of focus occurs in the early stages of most PhDs. Mine was no different and, having begun with a decision to focus on how firms achieve benefits in cooptation, it quickly became clear that further depth was required. Within any question about how firms achieve benefits in cooptation is an implicit assumption that firms do achieve benefits in cooptation. However, as I moved to more critical review of the literature, there was reason to call this assumption into question.

Although benefits of cooptation were reported in the literature, including technological development (Gnyawali & Park, 2011), disruption (Ansari et al., 2016), and expansion (Garrette, Castañer, & Dussauge, 2009), it was unclear how they were generated. Theoretical explanation was lacking regarding intermediary mechanisms that enabled such benefits. Instead, the literature was dominated by caveats, with their basis in transaction cost economics (Coase, 1937; Williamson, 1975), that asserted that the underlying dynamics of cooptation generated additional risks and costs from heightened opportunism (Dussauge et al., 2000; Lavie, 2007; Park & Ungson, 2001; Rai, 2016).

This meant that, at a high level, the literature was rather incoherent. The dynamics of cooptation were reported to be risky, costly, and highly challenging, but, at the same time, the outcomes were reported to be largely beneficial. It raised an important question: how

do firms achieve beneficial outcomes in cooperation if the dynamics are so challenging? My research aimed to address this question by examining cooperation dynamics from a broader theoretical base than transaction cost economics and clarifying how they relate to value creation.

1.6 Contribution

My research contributes to literature on cooperation (Ansari et al., 2016; Gnyawali & Park, 2011; Rai, 2016) by challenging the widespread assumption that opportunism is heightened in cooperation (Dussauge et al., 2000; Park & Ungson, 2001). This establishes a foundation for better understanding of cooperation benefits and costs in future research. I provide a nuanced explanation of informal market-based safeguards which, up to a point, reduce opportunism in cooperation, and I explain why this effect reverses when market commonality is high. This clarifies the nature of opportunism in cooperation and explains conflicting findings in the extant literature (Park & Russo, 1996; Shipilov, 2009). My research also illuminates key moderators of opportunism in cooperation and highlights important advancements for the cooperation literature and the underpinning theories of competitive dynamics and the resource-based view.

For managers contemplating cooperation, my research offers evidence that the negative effects of opportunism are not as universal as the extant literature has assumed. This moves us beyond simplistic perceptions that have emphasized instability, knowledge leakage, and formal safeguards in cooperation. Instead, I identify an efficient and effective alternative for constraining opportunism. This indicates that establishing, maintaining, and ultimately achieving value creation in cooperation relationships may be less

challenging and costly than the literature assumes. Given the potential benefits of coopetition for participants (Ansari et al., 2016; Garrette et al., 2009) and wider society (Gnyawali & Park, 2011; Jorde & Teece, 1990), there are important firm and economy level implications.

1.7 Evolution of strategic management research

Theory regarding simultaneous competition and cooperation has its roots in the strategic management literature. Broadly speaking, strategic management is concerned with determinants of firm performance (Nag, Hambrick & Chen, 2007; Rumelt, Schendel, & Teece, 1994), with early literature treating performance as something that the firm achieved individually (Barney, 1991; Porter, 1980). However, environmental and economic forces, such as globalization and the increasing speed of technological development, have meant that firm boundaries have become increasingly blurred and firm performance is often achieved through inter-firm relationships.

Much of the strategic management literature can be traced back to industrial organization economics (Bain, 1956; Mason, 1939). In particular, the focus of industrial organization on finding ways to make markets more competitive is a key precursor to the emergence of the positioning school in strategic management. As industrial organization researchers searched for economic forces that obstructed market competition, such as barriers to entry (Bain, 1956), the positioning school emerged from efforts to turn these insights on their head. In *Competitive Strategy*, Porter's (1980) central insight is to flip these arguments: instead of obstacles of market-level competition, they became sources of firm-level performance in a market. Porter employs industrial organization logic to highlight five

forces, the threat of new entrants, bargaining power of buyers, bargaining power of suppliers, substitutes, and rivalry among incumbents, that can help a firm find a position in an industry that is most beneficial to performance. This positioning approach to firm performance represented a major breakthrough at the time and remains valuable for performance within stable and sustainable market structures. However, in dynamic markets, or those characterized by rapid technological change, market structures evolve rapidly and therefore become less relevant for performance. Instead, researchers look towards internal heterogeneities that persist over time to explain firm performance (Teece et al., 1997).

The shift in emphasis towards internal heterogeneities led to the emergence of the resource-based view (RBV) of firm performance (Barney, 1991; Wernerfelt, 1984). While the positioning school assumes that firms are homogenous entities, the RBV asserts that firms are heterogeneous in terms of their internal resource endowments. Through their role in value creation for the firm, the RBV suggests that internal heterogeneities, rather than market positions, are the basis for firm performance. Resource endowments are somewhat 'sticky' (Barney, 1991; Teece et al., 1997), in that firms are assumed to be stuck with the resources they have and may not easily create or acquire those which they lack. Value creation is achieved when firms control valuable, rare, inimitable, and non-substitutable resources (Barney, 1991) that are heterogeneously distributed and not easily tradeable (Dierickx & Cool, 1989; Wernerfelt, 1984). However, the RBV offers a rather static view of internal heterogeneities. It overlooks the dynamism of evolving market demands (Eisenhardt & Martin, 2000; Teece, 2007) and the creativity required to organize

resources in ways that can optimize their market value (Alvarez & Busenitz, 2001; Barney, 2001).

Scholars have addressed limitations of the RBV by explicating the role of firm capabilities. A capability is a set of activities to organizes firm resources for a particular use (Teece, 2014; Winter, 2003). Two classes of capabilities exist: ordinary and dynamic (Eisenhardt & Martin, 2000; Teece et al., 1997). Ordinary capabilities are task-based: they enable operational, governance, administrative, and technical functions (Teece, 2007). Dynamic capabilities involve higher-level activities that can orchestrate and adapt the firm's resources to address rapidly evolving market requirements (Teece, 2014). Dynamic capabilities move beyond learning from experience (Winter, 2003) and bring the imaginative and creative skills of the firm into play, both in the identification of new opportunities and the reorganization of resource endowments. This makes them particularly relevant in markets that are uncertain, non-linear, or discontinuous (Ambrosini, Bowman, & Collier, 2009). Dynamic capabilities "can be harnessed to continuously create, extend, upgrade, protect, and keep relevant the enterprise's unique asset base" (Teece, 2007: 1319) in rapidly changing environments. This is achieved through sensing changing requirements, reconfiguring capabilities, and the transformation of resources and routines based on experience.

Over time, globalization, increasing sophisticated consumer tastes, and rapid technological advancements, have challenged the view that a firm may only achieve performance from resources and capabilities it controls internally. As these forces have increased demands on firm's resource endowments, situations arise where the firm may not be able to satisfy its resource requirements from its internal endowments (Garrette et

al., 2009). To fill this void and explain firm performance in light of increasing resource demands, researchers have presented an external resource-based view of the firm (Dyer & Singh, 1998; Lavie, 2006). The external RBV suggests that, instead of internal control, some critical resources and capabilities may span firm boundaries and extend to the firm's external relationships (Cassiman, di Guardo, & Valentini, 2009; Dyer & Singh, 1998; Garrette et al., 2009). Though resources remain sticky, resource access, in addition to resource control, becomes a potential source of value creation and superior performance. Thus, an effective approach may not always be to protect internal endowments, but to share them and possibly be willing to accept some spillover where it is less than the anticipated inflows (Dyer & Singh, 1998). This offers mainstream theoretical explanation for the plethora of inter-firm relationships that can be observed in the literature, such as dyads (Hamel, 1991), groups (Gomes-Casseres, 1996), clusters (Giblin & Ryan, 2012) or networks (Gnyawali & Madhavan, 2001). An external resource-based view highlights how resources and capabilities accessed by multiple firms may still satisfy the pre-conditions for value creation (valuable, rare, inimitable, and non-substitutable) within their wider market context (e.g., Dyer & Singh, 1998; Lavie, 2006; Rai, 2016).

1.8 Evolution of conflicting firm behaviors

Two conflicting firm behaviors are evident in these explanations of firm performance: competition and cooperation. Competition is observed within the positioning school (Porter, 1980), and the traditional RBV and dynamic capability perspectives (Barney, 1991; Teece et al., 1997), where firms are assumed to be independent entities and engagements among them occur purely for competitive purposes. Cooperation is observed through the external RBV (Dyer & Singh, 1998; Lavie, 2006), where firms are unable to

satisfy resource requirements on their own and may participate in cooperative relationships to access critical resources. In the following subsections, I review important insights on inter-firm competition and cooperation, which are two conflicting behaviors that, until recently, have evolved largely independently in mainstream literature.

1.8.1 Inter-firm competition

Competition occurs where a firm and a competitor strive for superiority through mutually incompatible market positions (Porter, 1980). Mutually incompatible positions mean that two firms cannot achieve the same type of superiority in the same area; for example, pursuing transactions with the same customers (c.f., Porter, 1985). Competition may also occur through resources (e.g., Markman, Gionidis, & Buscholtz, 2009), but as resources are developed to meet market requirements (Day, 1981; Peteraf, 1993), incompatible market positions are the most fundamental aspect of competition (Chen, 1996; Gimeno & Woo, 1996a). “Without examining a firm’s strategic attributes in the market(s) where it actually interacts with others, one has little idea against whom it competes...” (Chen, 1996: 102).

Pursuit of incompatible market positions fuels head-to-head rivalry among firms and “an incessant race to get or to keep ahead of one another” (Kirzner, 1973: 20). Such rivalry is addressed within literature on competitive dynamics (Baum & Korn, 1996; Smith et al., 1992), which explains the nature of interactions when the firm competes with specific rivals (Chen, Smith, & Grimm, 1992; Chen, 1996). Competitive dynamics literature moves away from industrial organization and aligns with Austrian economics (Jacobson, 1992; Mises, 1949; Young, Smith & Grimm, 1996), whereby the markets in which

competition occurs are dynamic, participant-driven entities. The focus on market participants leads scholars to view competition as something that is fundamentally determined by firms and therefore to study their interactions as the basis for competitive dynamics. Through the study of firm actions and responses, competitive dynamics lends itself to precise and concrete analysis of firm competitive behavior.

An important divergence between competitive dynamics and the positioning view in strategic management is that competitive dynamics acknowledges firm heterogeneities and the inherently relative nature of inter-firm competition. This illustrates the asymmetric nature of competitive relations, where the competitive outlook is different depending on which side of the dyad is treated as the focal firm (Chen, 1996). Dyadic interactions are employed as the building blocks of competition and these may then be aggregated to understand all of the firm's competitive relationships (Baum & Korn, 1996; Gimeno & Woo, 1996a), competition within markets, or competition among multiple firms (Ferrier, 2001; Prince & Simon, 2009).

The extent of competition between the firm and a competitor is captured by their level of common markets. Market commonality, the proportion of the firm's markets in which it encounters a given competitor, reflects the degree of competition experienced by the firm with regard to that competitor (Chen, 1996). High market commonality occurs where the firm shares a large proportion of markets with the competitor, whereas low market commonality describes a small degree of overlap. As noted, market commonality differs depending on which firm-level perspective is considered – whether A has high market commonality relative to B says nothing about B's level of market commonality relative to A (Chen, 1996).

1.8.2 Inter-firm cooperation

Inter-firm cooperation refers to “voluntary arrangements between firms involving exchange, sharing, or codevelopment of products, technologies, or services” (Gulati, 1998: 293). Inter-firm cooperation occurs for a variety of purposes, including technological development (Gnyawali & Park, 2011), commercialization (Diestre & Rajagopalan, 2012), and learning (Hamel, 1991). Research on inter-firm cooperation emphasizes networked, interdependent relationships for the purpose of meeting critical resource and capability requirements that the firm cannot satisfy alone (Contractor & Lorange, 1988; Jarillo, 1988; Dyer & Singh, 1998). These, in turn, satisfy their market ambitions (Chen, 1996; Peteraf, 1993).

Theory on cooperative relationships has its roots in sociology (Granovetter, 1985; Macaulay, 1963), where the social structure of networks of economic relationships influences economic outcomes. A network consists of actors (nodes) and relationships (ties) among them (Burt, 1983; Wasserman & Faust, 1994). The dominant perspective on networks is a structuralist view where the focus is the nature of the ties (Burt, 1992; Kilduff & Tsai, 2003; Mayhew, 1980), rather than a social capital perspective where the emphasis is the capital that may accumulate in the node itself (Lin, 2001; Nahapiet & Ghoshal, 1998).

A cooperative inter-firm network emerges when multiple firms are connected through cooperative relationships with one another (Gulati, 1998; Jarillo, 1988). Network ties act as conduits and facilitate the flows of resources and capabilities (Gnyawali & Madhavan, 2001) that are the core focus of network theory (Gimeno, 2004; Gulati, 1999; Jarillo,

1988) and bear significant implications for firm behavior and performance. The intensity of cooperation within these ties varies from strong cooperation and special relationships', to weak cooperation and purely economic agreements (Uzzi, 1997).

Strong cooperation is established and sustained by focusing on mutual interests and building trust and reciprocity. It involves deep connections and social attachments leading to reciprocal norms and stability (Uzzi, 1999). For example, in dyadic relationships such as R&D agreements or joint-ventures with significant resource commitments, strong cooperation facilitates the pursuit of long term, ambitious goals through learning (Lazerson, 1995), fine-grained information transfer, and joint problem-solving arrangements (Uzzi, 1997). Weak cooperation describes arms-length type engagements, such as simple marketing or production contracts with limited human or social contact. Weak cooperation preserves autonomy and limits spillovers (Burt, 1992; Hamel, 1991; Lavie, 2006), but involves a narrow economic focus. The 'one-off' nature of such engagements often inhibits the emergence of reciprocity among partners, so weak cooperation may forego the deep connections and resource exchanges necessary for the achievement of complex mutual goals and meaningful joint development.

1.9 Interplay of inter-firm competition and cooperation

While the competitive dynamics literature has focused on actions and reactions that enable firms to achieve superior performance at the expense of one another, research on inter-firm cooperation has studied how firms work together to achieve superior performance. Despite the largely independent evolution of the competition and cooperation literatures, some research has examined the interplay between these conflicting behaviors. Three

streams of research have emerged in this area: the networks view, the contextual view, and the dyadic view.

The networks view of the interplay between inter-firm competition and cooperation emphasizes competitors who are connected by cooperative relationships in a network (Andrevski & Ferrier, forthcoming; Gnyawali et al., 2006; Sanou et al., 2016). This stream juxtaposes theory on competitive dynamics against that of cooperative networks to shed light on how the firm's position in the cooperative network influences its competitive behavior. Network theory highlights how advantageous network positions are those that are central (large number of connections) and structurally autonomous (many non-redundant ties) (Burt, 1992; Gimeno, 2004; Gulati, 1999; Jarillo, 1988). The network view of competition and cooperation illustrates how the advantages that firms derive from these positions make them more likely to initiate a competitive action and less likely to experience a response (Gnyawali & Madhavan, 2001). Network centrality is positively related to both volume (Gnyawali et al., 2006) and diversity (Sanou et al., 2016) of competitive actions, while autonomy is positively related to diversity (Gnyawali et al., 2006). In shaping firm competitive behavior, this view shows how cooperative network patterns become a critical determinant of performance (Gulati, Nohria, & Zaheer 2000; Rowley, Behrens, & Krackhardt, 2000). For instance, by fueling an increased volume and diversity of actions, a large number of cooperative relationships in a network of competitors can enhance performance (Sanou et al., 2016), especially in dense networks (Andrevski & Ferrier, forthcoming).

The contextual view of the interplay between inter-firm competition and cooperation emphasizes how the firm may benefit from maintaining some competitive relations and

some cooperative relations (Brandenburger & Nalebuff, 1996; Bresser, 1988; Lado et al., 1997). This enables the firm to maintain a high degree of flexibility by holding a variety of strategic options (Brandenburger & Nalebuff, 1996; Kogut, 1991; Lado et al., 1997). With its roots in game theory (Axelrod, 1984; Oye, 1986) where the outcome of the firm's action depends on the actions of others, research in the contextual view challenges a common presupposition that all firms should initially be viewed as a competitive threat. If the firm is not limited to observing engagements through such a competitive lens, the possibility to grow the market (e.g., Frey & Schlosser, 1993; Hahn, Kim, & Kim, 1986) through cooperative 'win-win' relationships becomes apparent. Thus, the firm may cooperate with an important complementor to grow the overall size of the market and then compete with direct competitors to divide it up (Brandenburger & Nalebuff, 1996). The contextual view studies this choice of between cooperation *or* competition from the perspective of the firm.

The dyadic view of the interplay emphasizes simultaneous competition *and* cooperation between firms (Bengtsson & Kock, 2000; Gnyawali & Park, 2009: 2011). Where the firm looks to external cooperative relationships to satisfy resource requirements, it is more likely to focus on resources and capabilities that are strategically relevant (Das & Teng, 2000; Gulati, Lavie, & Madhavan 2011). The resources and capabilities of greatest relevance are often held by competitors because they target similar customers and confront similar challenges (Dussauge et al., 2000; Gnyawali & Park, 2009: 2011; Ritala & Hurmelinna-Laukkanen, 2009). Thus, simultaneous competition and cooperation emerges. Engaging in simultaneous competition and cooperation with another firm can provide access to relevant and complementary resources (Bengtsson, Eriksson, &

Wincent, 2010), and reduce the time and costs associated with internal development (Gnyawali & Park, 2009). Competitors may also cooperate to combine homogenous resources and advance major projects that are risky to pursue alone (Garrette et al., 2009), achieve economies of scale, or pursue other cost-sharing objectives. If firms compete based on homogeneous resources, cooperation can protect them from other competitors or serve as a means by which the combined resource pool can be grown (Ingram & Qingyuan, 2008). Simultaneous competition and cooperation is associated with benefits that firms may not achieve alone, including technological development (Gnyawali & Park, 2011), disruption (Ansari et al., 2016), and expansion (Garrette et al., 2009). The dyadic view also highlights potential societal benefits associated with advanced technological development available at competitive prices (Gnyawali & Park, 2011; Jorde & Teece, 1990).

The focus of my research is the dyadic view on the interplay of inter-firm competition and cooperation. This view studies the phenomenon of simultaneous competition and cooperation, which is often labelled ‘coopetition’ in the literature. Coopetition is the focus of the remainder of this dissertation.

1.10 Chapter summary

My research aims to clarify the nature of coopetition dynamics, specifically opportunism in coopetition, and its influence on value creation in coopetition. A burgeoning body of literature on coopetition is characterized by the assumption that heightened opportunism leads to significant costs and challenges (Dussauge et al., 2000; Park & Russo, 1996; Park & Ungson, 2001). In light of this dominant assumption, my research intends to explain

why pursuit of coopetition continues to rise (Gnyawali & Park, 2009; Harbison & Pekar, 1998) and often proceeds without formal safeguards to constrain opportunism (Ryu & Reuer, 2016). Further, by connecting opportunism to firm value creation in coopetition, I intend to clarify how widely reported benefits from are achieved despite the assumption of opportunism.

In Chapter 1, I have provided an outline of the research process and structure and explained the theoretical background for my research. My contributions are intended for the field of strategic management, which has evolved from a focus on strategic positioning (Porter, 1980), and internal resources and capabilities (Barney, 1991; Teece et al., 1997), to a recognition that firms may derive performance from their external relationships (Dyer & Singh, 1998; Lavie, 2006). Two conflicting firm behaviors are observed in this evolution: inter-firm competition (Baum & Korn, 1996; Chen et al., 1992), which is understood through the concept of market commonality (Chen, 1996) and inter-firm cooperation (Contractor & Lorange, 1988; Hamel, 1991), observed through cooperative ties (Gnyawali & Madhavan, 2001; Gulati, 1998). These behaviors have been studied largely independently, but three streams of research have examined their interplay. My research is aligned with the dyadic view of the interplay between competition and cooperation, where the focus is simultaneous competition and cooperation between firms (henceforth coopetition).

In Chapter 2, I present a critical review and synthesis of the literature on coopetition, and some necessary conceptual development to clarify the phenomenon's core properties.

Chapter 2: Critical Review and Synthesis

2.1 Introduction

The rising importance of the phenomenon of coopetition noted by Ketchen and colleagues (2004) is underscored by the growth in the volume of research that is emerging, including several special issues in journals such as *Industrial Marketing Management* (Bengtsson & Kock, 2014; Bengtsson, Kock, Lundgren-Henriksson, & Näsholm, 2016; Le Roy & Czakon, 2016). Special Issues of *Strategic Management Journal* and *Long Range Planning* are also underway. This growth has led to interesting opportunities and challenges as exploration by researchers with different perspectives offers opportunities to build on the concept's diversity and develop a more holistic and integrated understanding. At the same time, this diversity, as well as a lack of attention to key defining properties, have led to ambiguity concerning the boundaries and definition of coopetition, as well as the factors that enable value creation in coopetition (Bengtsson & Raza-Ullah, 2016; Gnyawali & Song, 2016; Ketchen et al., 2004). In order to proceed with the central aims of this research, I first undertake a critical review and synthesis of the literature to address these challenges.

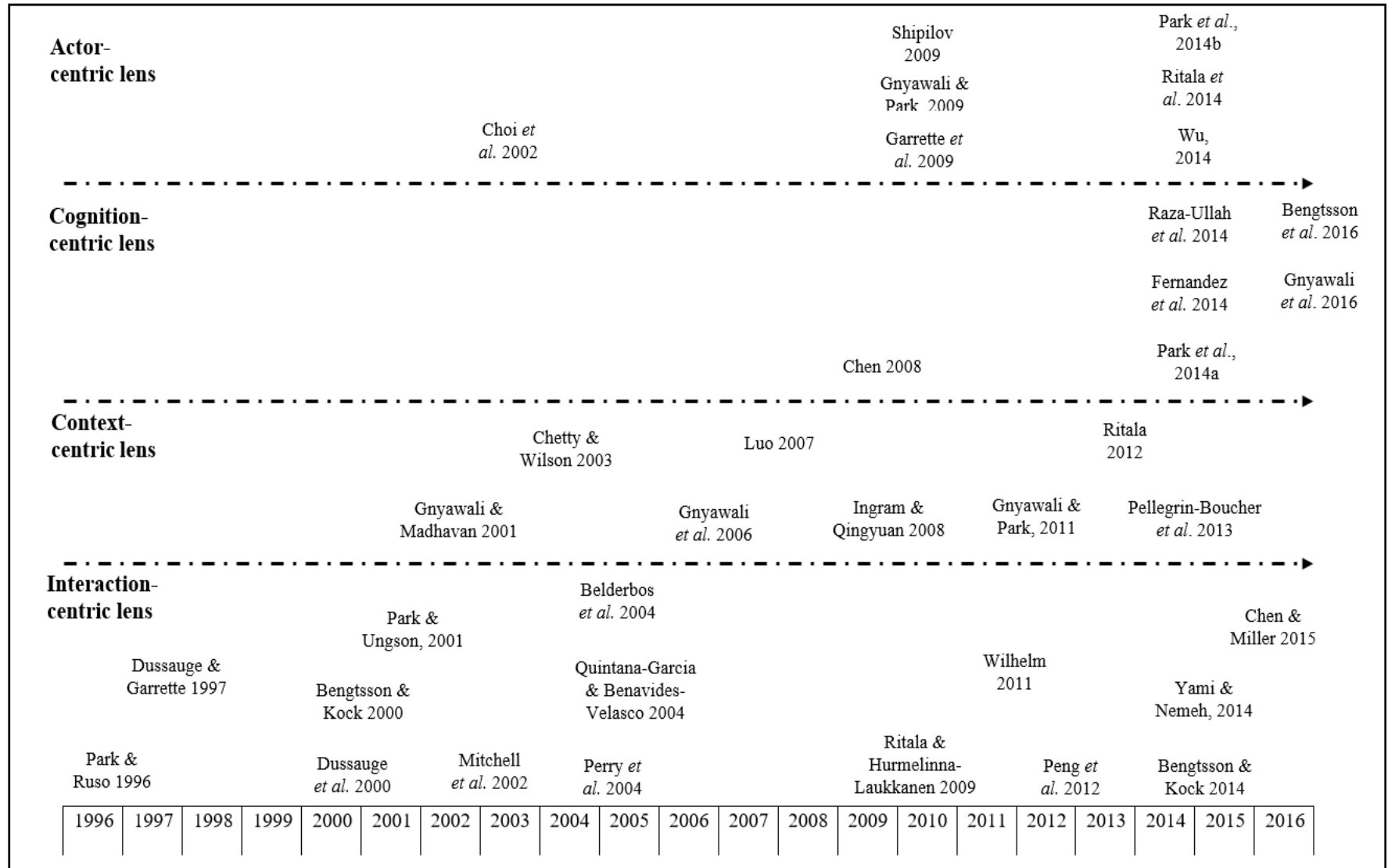
I begin by the reviewing the literature through four lenses that have been utilized to study coopetition: actor-centric, interaction-centric, cognition-centric, and context-centric (Section 2.2). To address ambiguity regarding the boundaries and definition of coopetition, I next develop three defining characteristics of coopetition that characterize the phenomenon under study and distinguish it from related phenomena (Section 2.3). I

then explicate core implications of inter-firm competition and cooperation (Section 2.4) and juxtapose them to develop unique implications of coopetition that enable value creation (Section 2.5). This critical review is the product of a systematic literature search, the method for which is outlined in Appendix I.

2.2 Four lenses of coopetition research

To organize the literature on coopetition, I begin by highlighting four distinct lenses that have been used to examine the phenomenon: actor-centric, interaction-centric, cognition-centric, and context-centric. Each lens has a unique take on the phenomenon and, in combination, they provide a holistic overview of how the coopetition phenomenon has been studied. The temporal evolution of research papers employing these different lenses is depicted in Figure 2.1. The variation in the research focus is apparent in the transition from one lens to another, with each offering unique perspectives on simultaneous competition and cooperation between firms. For example, a cognition-centric lens helps illustrate the mental models required to embrace coopetition and manage the cognitive strain that emerges from the coopetition paradox. Meanwhile, the actor-centric lens examines the complexities associated with specific partner characteristics.

Figure 2.1: Evolution of four coopetition research lenses



2.2.1 Actor-centric lens

An actor-centric lens adopts a firm-level focus to analyze firm characteristics that influence cooperation, such as who collaborates with whom, for what purpose, and what benefits and challenges arise as a result. This lens is helpful to understand how particular firm characteristics shape the drivers, formation, nature, and outcomes of the cooperation (Gnyawali & Park, 2011; Shipilov, 2009) and the fit or 'alignment' between partners (Choi, Wu, Ellram, & Koka, 2002). Research in this lens has addresses questions such as: What are the key partner characteristics to generate superior performance? Is cooperation more important for certain types of firms? How do particular competitive interests shape the cooperation relationship? A diverse range of firm-level characteristics have been examined including partner resource and capabilities (Garrette et al., 2009; Gnyawali & Park, 2009: 2011; Ritala, Golnam, & Wegmann, 2014), market commonality (Park & Russo, 1996; Park et al., 2014b), collaborative experience (Garrette et al., 2009; Park, Srivastava, & Gnyawali, 2014a), and congruence and divergences of partners' interests (Parkhe, 1993; Hamel, 1991).

Adopting this actor-centric lens, Choi and colleagues (2002) find that, where synergies in resources and intentions exist, cooperation can positively affect performance. Similarly, Shipilov (2009) finds that market commonality between cooperation partners is associated with increased financial performance, while Park and colleagues (2014b) find that, up until a point, market commonality has a positive influence on innovation performance but benefits decline when market commonality between firms becomes very high. Gnyawali & Park (2009) suggest that cooperation may be more beneficial for smaller firms rather than large because SMEs can overcome liabilities of smallness (lack of an influential

voice, resource constraints, presence of large competitors) by cooperating with one another. The pair also suggest that actors' market commonality, technological complementarity, and perceived vulnerability drive formation of coopetition relationships between firms.

2.2.2 Interaction-centric lens

The interaction-centric lens focuses on nature of interactions and the areas in the value chain where interactions take place (Bengtsson & Kock, 2000; Mitchell, Dussauge, & Garrette, 2002; Yami & Nemeh, 2014). It is related to the actor-centric perspective in that firm characteristics influence resulting interactions. Scholars employing an interaction-centric lens emphasize the competitive or cooperative element of the interaction, and some have emphasized both. Interactions can occur within the same aspect of value chain (such as competition and cooperation in R&D) or different aspects of the value chain (such as cooperation in R&D and competition in product development). This lens advances research questions such as: How does the locus of coopetition in the value chain influence the nature and dynamics of the coopetition engagement? What are the best managerial practices to achieve superior performance through coopetition? How can the firm protect itself against competitive aggression and spillovers? The types of interactions that have been considered include the balance between competition and cooperation within the relationship (Bengtsson & Kock, 2000) and firm (Ritala & Hurmelinna-Laukkanen, 2009), governance decisions (Mitchell et al., 2002), and the toolkits necessary to achieve competitive advantages through coopetition (Chen & Miller, 2015).

The interaction-centric lens contributes a number of important insights to coopetition

research. Dussauge and colleagues (2000) find that both takeovers and significant reorganizations occur more frequently when competitors share heterogeneous resources. This is similar to Hamel (1991), and Quintana-Garcia and Benavides-Velasco (2004), who suggest that cooperative interactions involving heterogeneous capabilities can be used as vehicles to 'outlearn' the other partner. It may be, therefore, that spillovers between competitors who are cooperating for R&D have a less positive impact than between non-competitors (Belderbos et al., 2004). However, Chen and Miller (2015) suggest that firm will be more concerned with advancing their own performance, rather than disadvantaging their partners.

2.2.3 Cognition-centric lens

The cognition-centric lens emphasizes the unique mindset required to simultaneously comprehend the conflicting logics of competition and cooperation (Bengtsson & Kock, 2000). This creates a paradox (Lewis, 2000; Smith & Lewis, 2011) that creates tension in the relationship which must be understood and managed (Fernandez, Le Roy, & Gnyawali, 2014; Gnyawali, He, Madhavan, & Bengtsson, 2016). One important aspect of the cognition-centric lens lies in its ability to analyze the cognitive frames of executives and others at the intersection of the alliance (Bengtsson & Kock, 2000; Raza-Ullah & Bengtsson, 2014). Questions this lens seeks to address include the following: How does the paradoxical inter-relationship between simultaneous competition and cooperation manifest as cognitive challenges for executives? How do managers and individuals cope with the cognitive strain associated with balancing these conflicting logics? How should firms organize competition and cooperation to maintain paradoxical tensions?

The types of contributions offered by this lens fall into two groups. One is extensive analysis of the challenges associated with managing two conflicting logics of interaction, and how managers may cope. This lens suggests that tensions are an inherent part of the relationship (Fernandez et al., 2014; Park et al., 2014b) and should be managed – rather than minimized or eliminated (Gnyawali et al. 2016). The other builds from these insights to explore the cooperation ‘mindset’ – a unique cognitive capability for achieving superior performance through cooperation (Bengtsson, Raza-Ullah, & Vanyushyn, 2016; Gnyawali et al., 2016). Cooperation mindset is a holistic mindset, rather than an either-or balance, where competition and cooperation may be viewed as two tightly interrelated elements of a unified whole (Chen, 2008).

2.2.4 Context-centric lens

The context-centric lens focuses on the relationship between cooperation and its wider context. Researchers focus on two important aspects: (1) the environmental and technological conditions shaping cooperation (Gnyawali & Madhavan, 2001; Gnyawali & Park, 2009:2011; Ritala, 2012) and (2) the reciprocal impacts of cooperation on the relevant industry and wider societal welfare (e.g. Ingram & Qingyuan, 2008; Jorde & Teece, 1990; Tong & Reuer, 2010). Prominent questions include: How does a firm's position in the network shape the firm's opportunities and ability to engage in cooperation? What environmental characteristics drive cooperation formation and/or success? How can a firm use cooperation to re-shape its environment to its advantage? How does cooperation among key firms in an industry shape subsequent cooperation in the industry? This lens highlights how influence of cooperation on performance is enabled by a number of contextual factors, such as competitive intensity, network externalities (Ritala, 2012), and

network density (Gnyawali & Madhavan, 2001).

A core focus in this lens is the importance of cooperation in technologically intensive areas. Gnyawali & Park (2009: 2011) suggest that this is enabled by industry-level forces including short product life cycles, high R&D costs, and rapid innovation cycles. Other industry factors that are examined include dynamism, technological intensity (Bengtsson & Johansson, 2014; Pellegrin-Boucher, Le Roy, & Gurău, 2013), and market uncertainty (Ritala, 2012). An agglomeration of findings appear to support the importance of cooperation in these contexts. Garrette and colleagues (2009) find that relationships between competing aerospace manufacturers were established to pursue expansion projects that are beyond the technological capabilities of a single manufacturer, while Ritala (2012) finds that cooperation was associated with increased innovation performance with a multi-industry sample. In addition, Ansari and colleagues' (2016) study of TiVo's efforts to disrupt how television is experienced, finds that cooperative relations with incumbents were critical for establishing TiVo as the dominant Digital Video Recorder (DVR) standard.

The other key focus of the context-centric lens is the influence of cooperation on the surrounding environment. While a traditional economic viewpoint perceives competitor-cooperation as welfare-destructing (Smith, 1776), Ingram & Qingyuan (2008) argue that the welfare effects of competitor-cooperation are context bound and will be perceived differently in different environments (such as national vs international arenas), and by different stakeholders. This reinforces Jorde & Teece's (1990) position that cooperation can be a key driver of technological innovation and economic growth. Similarly, in a case analysis of long-term joint venture between Sony and Samsung, Gnyawali and Park

(2011) report that coopetition leads to accelerated technological development by motivating other competitors to respond both individually and jointly, which drives advanced R&D and intense competition across the industry. When combined with the economies of scale that competitors achieved by working together, coopetition facilitates sophisticated technologies introduced at affordable prices for consumers.

2.3 Defining characteristics of coopetition

As noted, coopetition refers to *simultaneous competition and cooperation between firms*. However, identifying a common focus in the literature was rather difficult because researchers have employed differing boundaries and offered a wide variety of definitions for coopetition. Consequently, substantial ambiguity exists concerning what coopetition is and is not (Bengtsson & Raza-Ullah, 2016; Gnyawali & Song, 2016; Ketchen et al., 2004).

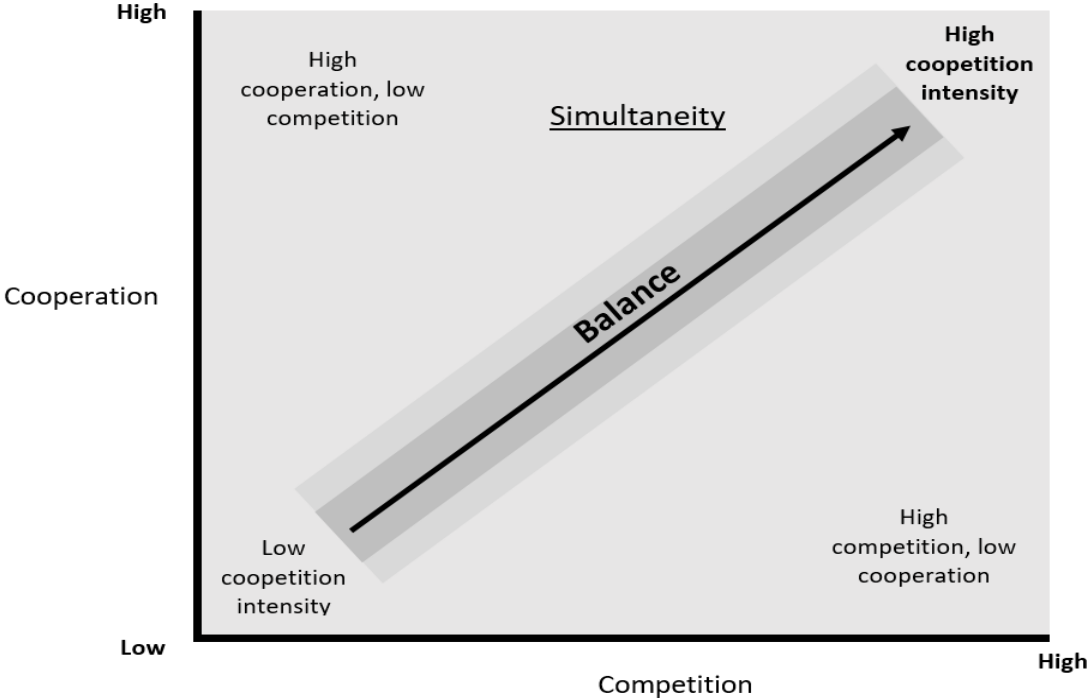
To provide clarity regarding the definition of coopetition and distinguish it from related phenomena, I now advance three defining characteristics of coopetition: simultaneity of competition and cooperation, the paradoxical interdependence of competition and cooperation, and value creation intent in coopetition.

2.3.1 Simultaneity of competition and cooperation

The simultaneity of inter-firm competition and cooperation is the most fundamental defining characteristic of coopetition. Temporal overlap between competition and cooperation makes coopetition a unique phenomenon that requires reaching beyond conventional literatures of competition and cooperation (Bengtsson et al., 2010). While

competitors entering into cooperation is more common (Bengtsson & Kock, 2000), collaborating partners may also begin competing with each other over time (Ansari et al., 2016). Significantly, however, not all coopetition engagements are the same nor have similar implications. Therefore, temporal overlap is just the starting point for analyzing the simultaneity of competition and cooperation.

Figure 2.2: An illustration of simultaneity, intensity, and balance in coopetition



Simultaneity in competition varies in two critical ways: intensity of competition and cooperation, and balance between competition and cooperation (Luo, Bu, & Gnyawali, 2016). Intensity refers to the magnitude of competition and cooperation, which is captured by the x and y axis in Figure 2.1 respectively. As the intensity of competition or cooperation varies, so too do the implications arising from the engagement. Balance refers to evenness between competition and cooperation. This is indicated by the diagonal line

splitting the axes in Figure 2.1. In coopetition, balance between competition and cooperation creates stability by offsetting potential challenges and keeping opposing forces in check (Das & Teng, 2000; Lado et al., 1997; Park et al., 2014b). Competition and cooperation are rarely balanced perfectly in practice, which is reflected by the wider area around the diagonal line in Figure 2.1, highlighting a level of oscillation where tradeoffs may still be achieved.

The framework of simultaneity, intensity, and balance offers a means for more systematic understanding of simultaneity in coopetition. Basic temporal overlap between competition and cooperation (represented by the entire area shaded in light grey) is treated as largely homogenous in certain parts of the literature, but this is not the case. On one hand, engagements where competition and cooperation are both weak (bottom left of Figure 2.1) are less challenging to understand and manage with limited costs and benefits. On the other hand, engagements where competition and cooperation are stronger will be more challenging, costly, and beneficial because of the simultaneous and strong pressures from competition and cooperation. This illustrates how, within the notion of broad temporal overlap between competition and cooperation, the nature of simultaneity can be further unpacked.

I will return to intensity and balance of competition and cooperation later in the chapter when I illuminate unique implications of coopetition that enable value creation. In addition to their utility as standalone concepts, intensity and balance facilitate conceptualization of coopetition intensity, which is a combination of the magnitude of competition and cooperation, and the level of balance between them. Coopetition intensity rises in line with balanced increases in intensity of competition and cooperation. Distinct

from intensity of competition and cooperation individually, coopetition intensity generates complex interdependencies between competition and cooperation, leading to paradoxical tensions, and unique benefits and costs (Gnyawali et al., 2016).

2.3.2 The paradoxical interdependence of competition and cooperation

The paradoxical interdependence of competition and cooperation is a second defining characteristic of coopetition. Paradox “denotes contradictory yet inter-related elements... that seem logical in isolation but absurd and irrational when appearing simultaneously” (Lewis, 2000: 760). A paradox arises when contradictory yet interrelated elements, such as competition and cooperation, exist simultaneously and persist over time (Smith & Lewis, 2011). The logics of interaction for competition and cooperation are conflicting and yet they represent the two interdependent elements of the coopetition ‘whole’ (Chen, 2008; Gnyawali et al., 2016) – where both elements are interrelated and interdependent (Peng, Pike, Yang, & Roos, 2012). Chen notes: “as the traditional yin-yang symbol suggests, opposites define and are defined by each other, so that it becomes impossible to conceptualize an idea without considering and incorporating its inverse.” (2008: 198). For example, competitors may work together to create mutual benefits but, in doing so, they are also helping each other to become stronger competitors, who will also compete to create their own value in common markets.

The coopetition paradox manifests through incongruities at the alliance and firm levels. At the alliance level, dualities involve the simultaneous pursuit of seemingly opposite ends (e.g., separation and integration). At the firm level, there are contradictions which stem from differences in partners’ priorities (e.g., the economic interests of the firm versus

those of the cooperation partner) (Gnyawali et al., 2016). Both contradictions and dualities lead to tensions which must be managed (Fernandez et al., 2014). Early cooperation research suggests that individuals cannot simultaneously balance two conflicting logics and so competition and cooperation need to be separated rather than integrated (Bengtsson & Kock, 2000). The separation approach is a predominantly Western attitude to avoid or sometimes confront paradox where the totality of the paradox becomes the sum of the parts. This contrasts with a more holistic Eastern approach, where a shift occurs from avoidance (separation) or confrontation (trade-off) to integration. Integration means that the totality of the paradox is not linearly determined by its components, which creates potential for the holism of the paradox to be understood and harnessed (Chen, 2008).

The paradoxical tension arising from this defining characteristic of cooperation may be leveraged through a suite of unique cooperation capabilities (Bengtsson et al., 2016; Gnyawali et al., 2016). Three critical capabilities have been identified in the literature: analytical capability, executional capability (Gnyawali et al., 2016), and emotional capability (Raza-Ullah, 2017). Analytical capability facilitates an accurate and holistic understanding of the sources of tension and their interdependencies, while executional capability describes the development, implementation, and utilization of routines, and determines how productively the tension in a cooperation relationship can be managed (Gnyawali et al., 2016). Emotional capability refers to an ability to accept, understand, and regulate ambivalent emotions, and their effects, stemming from opposing forces of competition and cooperation (Raza-Ullah, 2017).

2.3.3 Value creation intent in coopetition

A final defining characteristic of coopetition is firms' intent to create value. Value creation refers to the generation of additional benefits from a particular set of activities (Lavie, 2006; Rai, 2016; Ritala & Hurmelinna-Laukanen, 2009). Firms commit strategically important and specialized resources to coopetition relationships in anticipation of strengthening their market positioning by creating value which would not otherwise be possible. In aerospace, for example, cooperative relationships between competing manufacturers are established to pursue expansion projects that are beyond the capabilities of a single manufacturer (Garrette et al., 2009).

In coopetition, two distinct aspects of value are critical: creation of mutual benefits (Bengtsson & Kock, 2000; Gnyawali & Park, 2011) and creation of firms-specific benefits (Park and Russo, 1996). Mutual benefits refer to the total pie available to partners, whereas firm benefits are those that accrue specifically to one side of the dyad (Lavie, 2006; Rai, 2016). In combination, mutual and firm benefits determine overall value creation in coopetition (Khanna, Gulati, & Nohria, 1998; Rai, 2016). Mutual value creation is accomplished by combining complementary and scarce resources to generate new technologies, pooling homogeneous resources to increase their common value (Ingram & Qingyuan, 2008), developing capabilities and routines for sharing codified knowledge, and leveraging increased resource specialization and reduced transaction costs (Dyer & Singh, 1998). Firm-specific value is created when a focal firm combines its own portion of the mutual value with its own internal resources and capabilities (Gnyawali & Park, 2011), applies the knowledge and skills accessed through the alliance for pursuits outside the coopetition relationship (Hamel, 1991; Madhok & Tallman, 1998; Rai, 2016),

and uses knowledge gained to create future value in other areas.

Intent to create value in coopetition is illustrated by the S-LCD joint-venture, initiated by fierce global competitors Sony and Samsung to develop the underlying LCD (liquid crystal display) panel technology for LCD-TVs (Gnyawali & Park, 2011). Firm-specific value was enabled by the success of the joint R&D efforts, which helped both firms to launch their own range of LCD-TVs (Sony introduced its 'Bravia' range in 2005, while Samsung unveiled 'Bordeaux' in 2006). Competition between the two also helped to establish Sony and Samsung as global leaders in LCD-TVs and their promotion of the same underlying technology generated mutual value by establishing LCD as the dominant standards in digital TV (at the expense of PDP technology; led by Panasonic and LG). This propelled Sony and Samsung to global leadership in the wider TV market and their combined market share more than doubled across final four-years of the joint-venture. At the industry-level, the S-LCD venture led to accelerated technological development by motivating other competitors to respond both individually and jointly (e.g., the IPS Alpha venture among Panasonic, Hitachi, & Toshiba). These dynamics drove advanced R&D and intense competition across the industry. When combined with the economies of scale that competitors achieved by working together, it led to sophisticated technologies that were introduced at affordable prices for consumers.

The intent to create value in coopetition is the key difference between coopetition and collusion (Peng et al. 2012; Ritala & Hurmelinna-Laukkanen, 2009). In coopetition, value creation is the primary ambition (Gnyawali & Park, 2011; Jorde & Teece, 1990) whereas, in collusion, value capture is the main motivation (e.g., Dobbin & Dowd, 1997; Harris, 2012). Contrasting with the societal costs of collusion, there may be important societal

benefits from coopetition. First, coopetition facilitates unique products, new markets, and rapid technological innovation (Gnyawali & Park, 2011; Jorde & Teece, 1990), in forms that are “not only benign but procompetitive” (Federal Trade Commission & U.S. Department of Justice, 2000: 1). Second, simultaneous market competitions mean that coopetition outputs are subject to price competition. Consumers benefit from increased bargaining power (Brandenburger & Stuart, 1996) and advanced technologies at reduced prices where multiple firms are aiming to create value from the same underlying joint technology (Gnyawali & Park, 2011). Third, complementary capabilities mean that coopetition may facilitate specialization and division of labor within the industry. This cause the dyad to become more competitive than each partner in isolation (Gomes-Casseres, 2006) and motivates other firms to keep up by creating value through their own collaborations (Gimeno, 2004; Gnyawali & Park, 2011). Some possibility of collusive coordination undoubtedly remains within coopetition (Fusfeld, 1958; U.S. Department of Justice & Federal Trade Commission, 2000) because rational firms are unlikely to forego anticompetitive benefits, but for these reasons there is high likelihood of overall procompetitive outcomes from coopetition where value creation is the primary intent.

2.4 Implications of inter-firm competition and cooperation

Intent to create value in coopetition is matched by widely observed value creation outcomes in the literature (Bengtsson & Kock, 2000; Gnyawali & Park, 2011; Ritala, 2012). However, the underlying implications that enable such value creation have not been explained. The remainder of this chapter is given over to addressing this deficit. Since coopetition entails simultaneous competition and cooperation, a logical starting point for the analysis is the individual implications of these two constituent elements. The

following subsections unpack implications of inter-firm competition and cooperation individually and these are then juxtaposed to develop unique implications of cooptition that enable value creation.

2.4.1 Implications of inter-firm competition

Competition occurs where a firm and a competitor strive for superiority through mutually incompatible market positions (Porter, 1980). Inter-firm competition leads to two central implications: pursuit of excellence and resource potential.

Pursuit of excellence emerges from competition in the course of the competitive ‘race’ to achieve incompatible market positions (Kirzner, 1973). Competitors with high market commonality are motivated to relentlessly seek and pursue new opportunities to maintain and enhance their positions (Schumpeter, 1950), and deploy resources to their most productive uses (Lado et al., 1997). Superiority in common markets is bestowed on those who can employ resources more efficiently and innovate at a faster rate than their competitors (Hamel, Doz & Prahalad, 1989). Thus, the race for superiority motivates pursuit of excellence. This may accelerate innovation and technological development, while creating a force “through which resources 'gravitate' toward their most productive uses” (Lado et al., 1997: 119). However, at excessive levels, pursuit of excellence may also lead to aggressiveness between firms that incites hostility and causes competition for competition’s sake (Chen & Miller, 2015).

Resource potential is a second implication emerging from inter-firm competition. Resource potential refers to competitors’ complementary stocks of knowledge, skills, capabilities, and assets that are useful to one another (Bengtsson & Kock, 2000; Dussauge

et al., 2000; Gnyawali & Park, 2009). It arises where competitors who are attempting to secure incompatible market positions face many of the same opportunities and challenges (Baum & Mezias, 1992; Ingram & Qingyuan, 2008). Therefore, the resources developed to address them may be highly complementary (Gnyawali & Park, 2009). This cultivates synergies between competitors' resources and capabilities (Ingram & Qingyuan, 2008), but it also means that competitors are also disproportionately well-equipped to identify, assimilate, and apply each other's new and valuable knowledge (Dussauge et al., 2000; Gnyawali & Park, 2009). As a result, they are capable of capitalizing on any resource leakage to directly undermining each other's competitive positioning, which may also generate fear, suspicion, and mistrust between competitors.

Pursuit of excellence and resource potential are two core implications of inter-firm competition. In the next section, I outline important implications of inter-firm cooperation, before leveraging both sets of implications to develop the unique implications of cooptation that enable value creation.

2.4.2 Implications of inter-firm cooperation

Inter-firm cooperation refers to “voluntary arrangements between firms involving exchange, sharing, or codevelopment of products, technologies, or services” (Gulati, 1998: 293). Two core implications emerge from inter-firm cooperation: relational mechanisms and resource commitment.

As firms cooperate, they develop relational mechanisms, which stem from trust, shared norms, and social relations (Cao & Lumineau, 2015; Carson, Madhok, & Wu, 2006; Dyer & Singh, 1998; Macneil, 1980). Relational mechanisms manifest through cohesive ties,

and concrete and enduring strategic relationships (Gnyawali & Madhavan, 2001: 432). “...[O]ver time parties develop, test, observe, and confirm the existence of trust and other requisite norms for cooperative relationship, and... parties with such a social history increasingly rely on relational norms to govern their exchange.” (Poppo & Zenger, 2002: 722). Relational mechanisms can facilitate long-term, complex problem-solving through stability, deep understanding, and tacit knowledge transfer (von Hippel, 1989). However, deep cooperation with a few firms can lead to constraints and diminish the firm’s knowledge diversity (Burt, 1992). Innovation can be adversely affected where stability creates comfortable arrangements and long-term reliance on a single partner (Hamel et al., 1989; Lado et al., 1997).

Cooperation is also accompanied by resource commitments to the relationship. Partnerships are initiated to provide access to resources (Cassiman et al., 2009; Dyer & Singh, 1998) and promote resource flows (Gnyawali & Madhavan, 2001). Strong cooperation, such as R&D alliances and joint ventures, involves large resource commitments while weak cooperation, for example, distribution and procurement agreements, involves lesser commitments (Contractor & Lorange, 1988). Resource commitments offer opportunities for joint development (Garrette et al., 2009), internal innovation (Rai, 2016), and learning (Hamel, 1991) that extend beyond those accessible to a single firm (Barringer & Harrison, 2000). For instance, radical technological breakthroughs and similar ambitious projects require high volume and specialization of shared resources. However, resource commitments increase the risks of misappropriation (Khanna et al., 1998; Lavie, 2006) and specialization opens the firm to potential holdup (Goldberg, 1976; Williamson, 1985). Increased commitments also raise concerns of

optimal allocation and resource slack, where additional commitments to the same relationship may accrue diminished returns.

2.5 Implications of co-competition that enable value creation

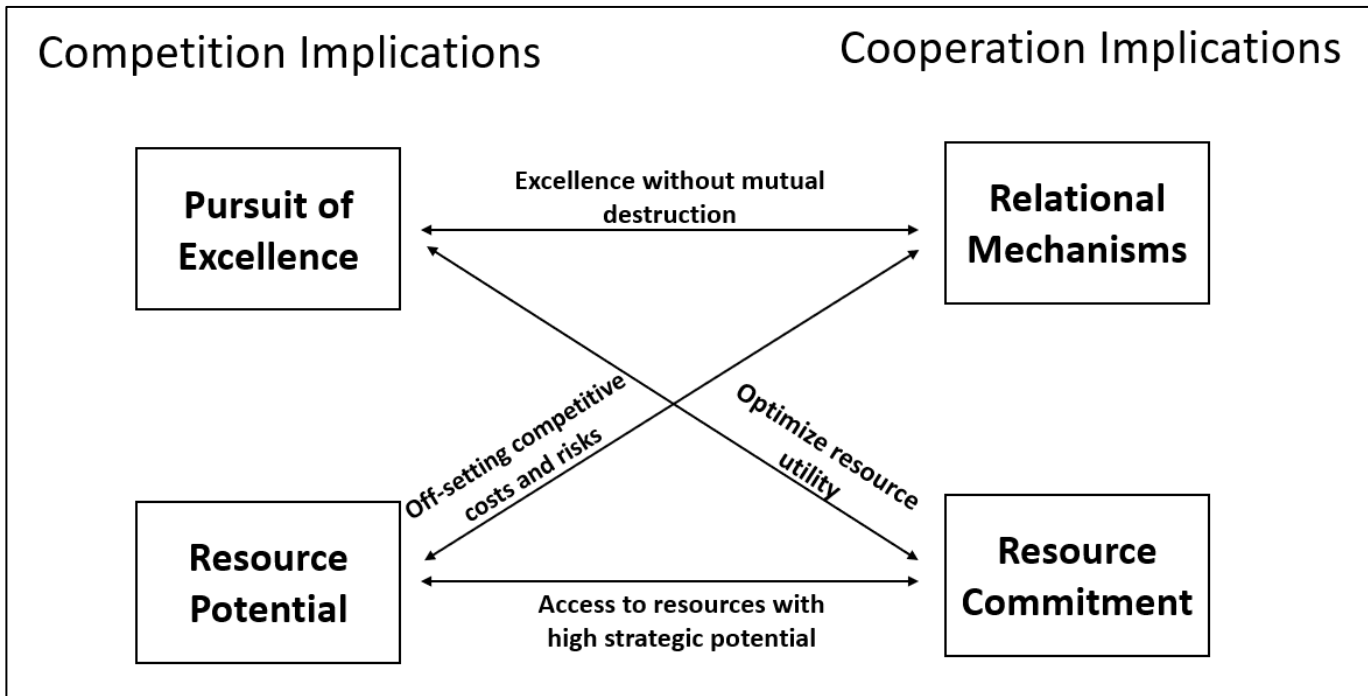
In co-competition, these implications of inter-firm competition and cooperation co-exist simultaneously. Together they generate unique implications that may enable value creation. The existence of such mechanisms are implied by the value creation outcomes reported in the literature but, as of yet, they have not been systematically developed. I now juxtapose these two sets of individual implications and incorporate the concepts of simultaneity, intensity, and balance, to illuminate implications of co-competition. I follow this by explaining how these may enable value creation in co-competition.

2.5.1 Implications of simultaneous competition and cooperation

Where competition and cooperation can be maintained at moderately strong levels, it may be possible to balance the benefits of each with the challenges of the other. With respect to competition, the pursuit of excellence and resource potential promote innovation and enable complementarities. Yet they may also fuel suspicion, hostility, and fear of resource loss. In terms of cooperation, relational mechanisms and resource commitments enable complex problem-solving and radical technological breakthroughs. But they can also expose the firm to spillovers and may limit incentives to innovate. Figure 2.3 summarizes how the individual implications of competition and cooperation generate potential for unique co-competition implications when they occur simultaneously. The arrows connecting the implications indicate the interplay and the text associated with each arrow indicates synergies when both aspects are moderately strong and balanced. The interplay between

each competitive and cooperative implication (i.e., each arrow) is now discussed in further detail.

Figure 2.3: Implications of simultaneous competition and cooperation



First, potential opportunities in cooperation from the interplay of the pursuit of excellence (competition) and relational mechanisms (cooperation) are reflected in the arrow labeled ‘excellence without destruction’ in Figure 2.3. Pursuit of excellence motivates a constant push for optimal resource allocation and new opportunity identification while relational mechanisms cultivates close and enduring relationships between firms (Lado et al., 1997; Uzzi, 1999). When both are present and strong, the proactive pursuit of self-interested excellence is aligned with an understanding and appreciation of joint dependencies. When both are balanced, firms have impetus to relentlessly pursue superiority while the informal norms offered by relational mechanisms create a safeguard against mutually destructive

behaviors. To a point, this effect is greater with increased intensity. However, where cooperation intensity becomes too high, relational mechanisms can limit flexibility and knowledge diversity (Burt, 1992) which generates negative synergies with strong pursuit of excellence. Where competition becomes dominant, pursuit of excellence incentivizes a level of self-interest that generates instability and sabotages mutual outcomes (e.g., Park & Russo, 1996). Where cooperation dominates and relational mechanisms prevail, excessively close relationships may blunt firms' competitive edge and diminish their push for productivity and innovation (e.g., Burgelman, 2002).

Second, simultaneous pursuit of excellence and resource commitments leads to optimal commitment or allocation of resources. Where competitors' pursuit of excellence is balanced with resource commitments from inter-firm cooperation, access to valuable knowledge and resources is complemented by strong impetus to optimize their productive utility. Pursuit of excellence drives firms to maximize the new opportunities (e.g., learning and skill development; Hamel et al., 1989) available through inter-firm cooperation. This suggests that balanced intensity of competition and cooperation is desirable but, as cooperation intensity becomes too high, negative synergies may arise as excessive resource commitments constrict the resources remaining for firm-specific benefits. Relatedly, where the pursuit of excellence outstrips resource commitments, firms depend on tit-for-tat gains and minor improvements. On the flipside, very high resource commitments can lead to slack resources which may be better utilized elsewhere and motivate reduced managerial commitment to the relationship.

Third, simultaneous resource potential and relational mechanisms creates opportunities for the informal norms arising from relational mechanisms to offset some challenges

associated with resource potential. Resource potential exists because competitors rely on similar foundational resources, but these may also be employed to cannibalize the sources of each other's superiority. This fuels mistrust, suspicion, and fear of loss (Das & Teng, 2000) and, as a result, greater monitoring and protection mechanisms are often required (Hennart, 1988; Kogut, 1989). Where resource potential is balanced with relational mechanisms, however, these informal cooperative norms can serve as a self-enforcing safeguard against aggression and spillovers (e.g., Dyer & Singh, 1998). Thus, partners may be able to share high potential resources without fear of loss. Where competition intensity becomes too high, these positive implications may be reversed as deep cooperation leads to strategic inflexibility and a potential 'lock-in' effect (e.g., Burgelman, 2002). Similarly, challenges may emerge where the implications of either competition or cooperation are dominant. If resource potential outstrips relational mechanisms, the threat of spillovers is greater, requiring intricate safeguards to pre-empt knowledge costs. Alternatively, when relational mechanisms exceeds resource potential, it may lead to stable but mediocre relationships with limited opportunities for superiority (e.g., Lado et al. 1997).

Fourth, simultaneity of resource potential and resource commitment generates prospects for enhanced access to high quality resources. Resource potential cultivates complementarities among resources and capabilities, while the extent of complementarities is determined by the level of resource commitment. As the volume and specialization with which high potential resources are committed increases, both mutual and firm opportunities are enhanced. This balance may generate positive effects to a point, however, where competition intensity becomes too high, these may reverse as the firms'

to which firms' high potential resources are committed to the relationship means that individual differentiation becomes challenging. Instability follows as competitive racing and aggression are incentivized (Khanna et al., 1998). Similarly, where resource potential outstrips resource commitment, it generates frustration from limited opportunities and may motivate firms to look elsewhere for resources. In contrast, if resource commitments exceeds resource potential, restricted scope for complementarities may not yield rewards proportional to the cognitive strain of cooperation.

Based on the interplay of these dimensions, I suggest that beneficial outcomes accrue to cooperation partners where competition and cooperation are moderately strong and balanced (e.g., Park et al., 2014b). These enable both mutual and firm value creation in cooperation. I now explain how the implications of moderately strong and balanced competition and cooperation enables value creation in cooperation.

2.5.2 Implications for value creation

Mutual value creation is enhanced through the pursuit of large-scale opportunities that a single firm could not achieve alone (Barringer & Harrison, 2000). Moderately strong competition preserves firms' impetus to tackle ambitious and complex problems, and moderately strong cooperation provides stability and deep social connections required to resolve them (Uzzi, 1999). Pursuit of excellence uncovers new value creation opportunities and helps to ensure that slack is minimized and that resources are optimally allocated within the dyad (e.g., Schumpeter, 1934; Vickers 1995). Meanwhile, relational mechanisms provide the glue that enable partners to realize them together and promotes resource sharing without fear of loss (Dyer, 1997). When competition and cooperation are

balanced, resources are contributed with a volume, specialization, and complementarity, that is conducive to value creation. Such contributions can be combined in novel ways to generate synergies that create more value than the sum of their parts in isolation (e.g., Barringer & Harrison, 2000; Gnyawali & Park, 2011).

Firm value creation is enhanced through rapid internal innovation when competition and cooperation are balanced and moderately strong. Competition generates a race with a competitor partner who is accessing the same jointly developed technology, while cooperation offers opportunities to derive individual benefits from valuable external resources and learning opportunities. Although firms are driven to pursue the best individual outcomes, relational mechanisms may help firms to find an optimal balance between mutual interests and self-interest (e.g., Das, 2005). This reduces the need for intricate safeguards against aggression and spillovers, which preserves firm resources for value creating purposes (Dyer, 1997; Dyer & Singh, 1998). Over time, the transformation and improvement of resources, and an enhanced reputation for coopetition ‘success’, also creates value by making the firm more attractive to future partners (Hamel, 1991; Hill, 1990).

2.6 Chapter summary

As the coopetition literature is quite fragmented, Chapter 2 addressed some core challenges that enable me to proceed to the central research gaps for this study. I began the chapter by organizing the literature in terms of four lenses that have been used to study coopetition. An actor-centric lens emphasizes firm-level characteristics of coopetition and is helpful for understanding how these characteristics mold the nature of the interaction.

An interaction-centric lens studies the interaction itself, highlighting practices that may achieve superior performance through coopetition. A cognition-centric lens emphasizes the unique mindset required to harness paradoxical tension in the relationship. The fourth lens, context-centric, studies the context surrounding coopetition, and the environmental and technological conditions that shape the interaction.

I then explained how the definition and boundaries of coopetition are quite ambiguous, with numerous perspectives regarding what coopetition is and is not (Bengtsson et al., 2016; Gnyawali & Song, 2016; Ketchen et al., 2004). I sought to address this ambiguity by developing three defining characteristics of coopetition: simultaneity of competition and cooperation, the paradoxical interdependence of competition and cooperation, and value creation intent in coopetition. In combination, these defining characteristics characterize the phenomenon of coopetition and distinguish it from related phenomena.

The final section of the chapter highlighted core implications arising from inter-firm competition and cooperation and the implications when they coexisted simultaneously. Competition engenders pursuit of excellence and resource potential, whereas cooperation leads to relational mechanisms and resource commitment. When competition and cooperation are balanced and moderately strong, I outlined how the synergies generated between these sets of implications may enable value creation in coopetition.

Through the development of unique implications that enable value creation in coopetition, I have presented a nuanced but quite positive view of coopetition. As I will demonstrate in the next chapter, however, the dominant view in the literature is significantly more skeptical, particularly in regard to opportunism in coopetition. This assumption regarding

opportunism in cooptation is the basis for the core research gaps that my dissertation will address.

Chapter 3: Research Gaps

3.1 Chapter introduction

Having examined the broader literature on strategic management in Chapter 1, and the emergence of coopetition as a significant field of study in Chapter 2, I now bring greater focus to my analysis. In this chapter, I explain challenges in the literature leading to the two research gaps that this dissertation will address.

The core issue is that the extant literature is dominated by an assumption of heightened opportunism in coopetition (Dussauge et al., 2000; Park & Russo, 1996; Park & Ungson, 2001) despite the phenomenon's value creation promise. This assumption is at odds with rising pursuit of coopetition in practice (Harbison & Pekar, 1998; Gnyawali & Park, 2009), which often proceeds without formal safeguards to constrain opportunism (Ryu & Reuer, 2016). Consequently, there are concerns about the capacity of existing theory for explaining coopetition dynamics and the implications for value creation in coopetition.

The chapter begins by reviewing the important aspects of transaction cost economics theory (Coase, 1937; Williamson, 1975), from which the study of opportunism originates (Section 3.2). I then define opportunism and explain how it emerges in inter-firm exchanges (Section 3.3). Opportunism, referring to self-interest seeking with guile (e.g., lying, cheating, stealing, or evading obligations), is detrimental to inter-firm cooperation because it raises transaction costs and impedes value creation. My analysis of the literature finds that opportunism is assumed to be heightened in coopetition for three reasons: (1)

firms are motivated to behave opportunistically, (2) capable of behaving opportunistically, while (3) simultaneous inter-firm competition and cooperation introduces additional uncertainty to the relationship, which is conducive to opportunism (Section 3.4). This dominant assumption generates two research gaps (Section 3.5). The first gap is the failure of extant research to explain cooperation dynamics, which leads to the second gap, constrained theoretical development regarding value creation in cooperation. These gaps motivate the research objectives and research questions (Section 3.6) that this dissertation will address.

3.2 Transaction cost economics

Transaction cost economics (TCE) focuses on minimizing exchange costs by identifying the most efficient mode of organizing resources (Williamson, 1975: 1985). By analyzing how transaction dimensions influence costs, TCE facilitates distinctions ('discriminating alignment') between activities that are most efficiently conducted within firm boundaries and those which are not (Teece, 1985).

TCE began with the concept of market frictions (Coase, 1937) which refers to the costs of using the price mechanism in free markets (e.g., negotiating, bargaining, due diligence). TCE views such 'transaction costs' as the reason why firms exist: certain costs may be minimized when resources are organized within firm boundaries. TCE has evolved to consider other such transaction costs (e.g., partner search, contracting), which are employed as the basis for evaluating and discriminating between modes of organizing resources. Traditionally, TCE has emphasized two modes of organization: markets and hierarchies (Williamson, 1975: 1985).

Williamson's assertion that "any problem that can be formulated, directly, or indirectly, as a contracting problem can be investigated to advantage in transaction cost terms." (1985: ix) is largely borne out in the literature. TCE is popularly applied to explain vertical integration (Balakrishnan & Wernerfelt, 1986; Masten, Meehan, & Snyder, 1989; Monteverde & Teece, 1982; Williamson, 1985), where firms face decisions regarding forward and backward integration as an alternative to market transactions. It is also applied to cooperative inter-firm relationships (Heide & John, 1980: 1982; Hennart, 1990; Kogut, 1991; Parkhe, 1993) and, more recently, inter-firm competition relationships (Park & Russo, 1996; Park & Ungson, 2001).

TCE views the transaction as the basic unit of analysis, which enables scrutiny of the critical dimensions along which transactions differ. Though there are many relevant dimensions (e.g., frequency; Williamson, 1979), TCE views two dimensions as meriting attention above others: resource specificity and uncertainty (Williamson, 1975: 1985: 1991: 1996). On the basis of the potential to minimize transaction costs, these dimensions are employed to evaluate modes of organization (Santos & Eisenhardt, 2005; Teece, 1985; Williamson, 1975: 1985).

Resource specificity refers to the degree to which a resource is specialized for a given transaction (Williamson, 1975). This is reflected in the additional productive value it generates within the transaction versus its next best use. Resource specificity creates dependency in inter-firm transactions because a partner who invests in specialized resources stands to lose if the firm reneges on their commitment. "Inasmuch as the value of this capital in other uses is, by definition, much smaller than the specialized use for which it has been intended, the supplier [exchange partner] is effectively "locked into" the

transaction to a significant degree” (Williamson, 1979: 240). Six types of resource specificity are reported: site specificity, physical specificity, human specificity, brand name specificity, investment specificity, and temporal specificity (Williamson, 1991).

Uncertainty refers to partners’ limited ability to predict environmental changes and one another’s behavior under unforeseen circumstances (Williamson, 1985). There are two aspects of uncertainty: volatility and ambiguity (Carson et al., 2006). Volatility refers to the rate of change and the unpredictability with which the environment evolves, which creates uncertainty about future environmental conditions. Ambiguity refers to the level of uncertainty regarding perceptions of the environmental state: the level to which firms may differ in their perceptions of the same environment (Daft & Macintosh, 1981). Uncertainty interacts with bounded rationality, a key TCE assumption regarding human behavior. Bounded rationality refers to the limits on manager’s cognitive abilities that prevent them from anticipating all eventualities and acting in a wholly rational manner (Simon, 1957). In uncertain environments, bounded rationality increases the likelihood that exchange partners will need to adapt their agreement as the exchange evolves (Rindfleisch & Heide, 1997).

TCE has traditionally emphasized markets and hierarchies as two modes of organization but resources may also be organized in hybrid forms. Hybrids are situated between the traditional structures of markets and hierarchies (Joskow, 1987; Williamson, 1991). Inter-firm cooperation is an example of a hybrid form. Hybrids balance the benefits of coordination offered by hierarchies with the greater incentive intensity offered by markets, while compromising the costs of bureaucracy (hierarchies) with those of controlling self-

interest (markets) (Williamson, 1991). Hybrids, such as inter-firm cooperation, extend the traditional TCE dichotomy of ‘make or buy’ to ‘make, buy, or ally’.

3.3 Opportunism

Enabled by the transaction characteristics of resource specificity and uncertainty, opportunism is a central concern in TCE (Ghoshal & Moran, 1996; Madhok, 2002; Rindfleisch & Heide, 1997; Williamson, 1975: 1979: 1985: 1991). Opportunism refers to “self-interest seeking with guile” (Williamson, 1979: 234) and is a stronger form of the self-interest assumption that is widespread in economic theory. Self-interest in economic theory is generally superseded by firms’ obedience and faithfulness to rules and promises. Thus, self-interest ends where rules and promises begin. Opportunism, however, is not constrained by rules and promises. It allows for “strategic behavior” such as “the making of false or empty... threats or promises in the expectation that individual advantage will thereby be realized (Williamson, 1975: 26). TCE assumes that, given the opportunity, firms will behave opportunistically (Williamson, 1975: 1985). Therefore, even where the firm recognizes joint benefits from working with an exchange partner, strategic self-interest motivates the firm to pursue every incremental gain available from the exchange with the aim of appropriating as much as possible (Williamson, 1979: 242).

Examples of opportunistic behaviors include concealing resources, withholding full effort or open cooperation, absorbing skills, and making calculated efforts to confuse, manipulate or incompletely disclose information (Grossman & Hart, 1986; Khanna et al., 1998; Luo, 2006b; Williamson, 1979). In the course of cooperation with U.S. and European manufacturing firms, for example, Hamel (1991) observed efforts by a number

of Japanese firms to ‘digest’ the skills of their partners in areas beyond the scope of their partnerships (Hamel, 1991). More severe opportunistic behaviors may also be observed (Lumineau & Quélin, 2012; Luo, 2006a), such as stealing joint assets, evading obligations, terminating agreements without notice, or expropriating critical technologies (Luo, 2006b). For instance, following a semiconductor joint venture between Integrated Process Equipment and MEMC Electronic Materials, a Canadian civil court found that that Integrated Process Equipment had shirked their cooperative responsibilities and sold jointly developed research to a third party (St. Louis Post-Dispatch; 17 October 2001).

The role of resource specificity and uncertainty in facilitating opportunism is a key driver of both concepts’ prominence within TCE. Opportunism is enabled by resource specificity because it increases opportunities for the firm to take advantage of the partner. Where the partner has invested in transaction-specific resources, it creates a bilateral dependency with the firm. This exposes them to opportunism through ‘holdup’ (Goldberg, 1976), which occurs where the partner is coerced into ceding additional benefits to the firm to avoid losing the productive value of specialized resources. For instance, a partner who invests in specialized resources for joint R&D will earn no rewards for their investments if the joint pursuit of R&D does not proceed. The firm may exploit this to their advantage by threatening to terminate unless the partner agrees to offer additional concessions.

Opportunism is also enabled by uncertainty (Walker & Weber, 1984; Williamson, 1985), through both volatility and ambiguity (Carson et al., 2006). Volatility in the environment increases the need to adapt the terms of exchanges to align with changing conditions (Pilling, Crosby, & Jackson, 1994; Rindfleisch & Heide, 1997). Each adaption, involving bargaining and renegotiation, offers opportunities for firms to behave opportunistically

(Williamson, 1985). Ambiguity reduces the likelihood that opportunistic firms will be detected (Ouchi, 1980), because when behavioral perceptions are ambiguous, more opportunistic behaviors will go unnoticed. On the flipside, ambiguity also means that some non-opportunistic behaviors may be incorrectly perceived and punished as opportunism (Carson et al., 2006). This reduces incentives for firms to abstain from opportunism.

Opportunism presents a number of problems for hybrids and markets, which are not experienced when resources organized internally (Anderson & Oliver, 1987; Eisenhardt, 1985). Of most interest in TCE theory is the additional costs that opportunism introduces. To attenuate opportunism and safeguard specialized investments, partners employ formal contracts (Williamson, 1979). Contracts increase transaction costs because time and resources must be dedicated to specifying eventualities *ex ante*, as well as their coordination, monitoring and enforcement (Williamson, 1975: 1979: 1985). At the same time, bounded rationality means that firms cannot anticipate all eventualities, so contracts are inherently incomplete and cannot fully safeguard against opportunism (Cao & Lumineau, 2015; Cavusgil, Deligonul, & Zhang, 2004; Deakin & Wilkinson, 1998; Hart, 1988; Williamson, 1979).

In addition to increased costs, opportunism also obstructs value creation (Barthélemy, 2008; Das & Rahman, 2010; Gassenheimer, Bacus, & Bacus, 1996; John, 1984; Lumineau & Quélin, 2012; Luo, 2006a: 2006b; Luo, 2007; Williamson, 1985: 1991). Joint resource development requires substantial up-front costs and investments in specialized assets (e.g., Dyer & Singh, 1998; Fernandez et al., 2014; Gnyawali & Park, 2011), but the partner's opportunity to recuperate these costs is jeopardized when the firm

opportunistically attempts to pursue more benefits than they are entitled to. This occurs in four ways. One is the risk of holdup, where a partner who has invested in specialized assets may be strong-armed into ceding some additional benefits by an opportunistic partner. Another is the role of opportunism in inhibiting trust, impeding reciprocity, and limiting managerial attention available for value creation. This increases the probability that the cooperative agreement will lead to failure, dissolution, or termination (Luo, 2006a: 2006b: 2007; Park & Russo, 1996; Park & Ungson, 2001). A third, related way is that opportunism constricts the freedom and confidence with which resources are shared (Dyer, 1997; Dyer & Singh, 1998; Heide & Miner, 1992; Skarmeas, Katsikeas, & Schlegelmilch, 2002). A fourth is that, opportunism constrains the resources available for value creation because, instead of being utilized for productive purposes, they must be deployed to safeguard against opportunism (Luo, 2006a: 2006b: 2007).

Through its influence on both costs and benefits, opportunism impedes the harmonious and efficient organization of resources through inter-firm cooperation and deters firms from cooperating with each other. “But, for opportunism, most forms of complex contracting and hierarchy vanish” (Williamson, 1993: 97). Consequently, TCE views opportunism as “the ultimate cause for the failure of markets [and hybrids] and the existence of organizations” (Ghoshal & Moran, 1996: 17).

3.4 Opportunism in cooptation

The literature on cooptation is characterized by a widespread assumption that opportunism is heightened. Analysis suggests that three factors are driving this assumption. One is firms’ motivation to behave opportunistically in cooptation, while a

second is firms' capability for opportunism. A third factor is that simultaneous competition introduces additional uncertainty within inter-firm cooperation which, as outlined, is conducive to opportunism.

A basic explanation for the role of motivation and capability in influencing behavior is found in motivation theory (Atkinson, 1964; Rotter, 1954; House, 1971). The expectancy-valence framework emphasizes two factors underlying behavior: the subjective value ('valence') associated with successful execution of behavior and the probability ('expectancy') of successful execution (Vroom, 1964). These factors map onto firm motivation and capability. Motivation refers the subjective value of successful execution, while capability refers to the probability of successful execution (Chen & Miller, 1994; Chen, 1996).

First, firms have increased motivation to behave opportunistically in competition. Competitors pursue incompatible market positions, which mean they cannot achieve the same type of market superiority. Thus, in addition to increasing their share of benefits, an opportunistic firm may bolster their own market superiority by undermining or dislodging a market competitor. This may occur, for example, by internalizing their skills or stealing technology (e.g., Hamel et al., 1989; Hamel, 1991). The opportunity in competition to gain an edge over a direct competitor through opportunism generates increased motivation.

Second, resource potential among competitors increases their capability to behave opportunistically. Competitors with market commonality face many of the same opportunities and challenges, which leads to overlapping dominant logics and deep understandings of each other's priorities, strengths, and weaknesses (Dussauge et al.,

2000; Gnyawali & Park, 2009; Ingram & Qingyuan, 2008). These may be applied to opportunistic ends, such as deception, evasion, or confusion. Overlapping knowledge bases also expedites learning among competitors, making them disproportionately well-equipped to identify, assimilate, and apply each other's tacit knowledge and skills (e.g., Cohen & Levinthal, 1990; Lane & Lubatkin, 1998). Therefore, resource potential increases capabilities for opportunism in coopetition.

In addition, and returning to TCE logic, opportunism is enabled by increased uncertainty in coopetition. Uncertainty has two constituent elements: volatility and ambiguity (Carson et al., 2006). In coopetition, coexistence of market competitions alongside inter-firm cooperation leads to greater volatility because the relationship must evolve in line with both competitive and cooperative developments (Lavie, 2007; Padula & Dagnino, 2007). This increases the regularity with which agreements must be adapted and each adaption creates new opportunities for opportunism (Williamson, 1985). Through the complex, long-term nature of benefits in coopetition (e.g., Ansari et al., 2016; Gnyawali & Park, 2011), ambiguity (i.e., the level of uncertainty in perceptions) is also greater. This increases the potential for opportunism to go unnoticed or for non-opportunistic behaviors to be incorrectly sanctioned (Ouchi, 1980).

3.4.1 Widespread assumption that opportunism is heightened in coopetition

The dominant assumption that opportunism is heightened in coopetition is illustrated by Table 3.1 which outlines a selection of arguments espousing this view.

Table 3.1: Assumption of heightened opportunism in the coopetition literature

“... [in coopetition] the incentives to act opportunistically appear to motivate actions that threaten and frequently undermine joint ventures” (Park & Russo, 1996: 887)

“An alliance portfolio featuring a high proportion of the firm’s competitors is characterized by opportunistic [behavior]..., disputes, and considerable risk of undesirable leakage of resources...” (Lavie, 2007: 1194)

“Opportunistic hazards are inevitable in strategic alliances because of this competitive rivalry between partners” (Park & Ungson, 2001: 43)

“Alliances between competitors can lead to the loss of critical proprietary knowledge, to increased dependence of one partner vis-a`-vis the other, and even to the takeover of one partner by the other” (Dussauge et al., 2000: 100).

“[A] downside of co-opetition is technological risks. If a firm is not quite careful or happens to get an opportunistic partner, it could lose its secret and proprietary knowledge to the competitor-partner. (Gnyawali & Park, 2009: 322-323)

“...firms in horizontal partnerships also face greater risks of leakage of proprietary knowledge” (Belderbos et al., 2004: 1256)

“...conflicting demands [arise in coopetition between] the need to work together in order to create value and the temptation to be opportunistic in order to appropriate a greater share of the created value” (Park et al., 2014b: 211)

“... risks of transfer of confidential information and the risks of technological imitation [in coopetition]. Partners... need to protect their core competencies because they remain strong competitors...” (Fernandez et al., 2014: 223)

“...depending on... the extent of opportunism among the partners, a given firm might or might not obtain the expected share of the overall value created ...” (Garrette et al., 2009: 888)

“[c]o-opetitive relationships thus involve a high degree of interdependence with each other and are full of conflict, and yet the potential for payoff is also high” (Gnyawali & Park, 2011: 651).

The ten papers in Table 3.1 are but a small fraction of the literature that assumes opportunism is heightened in coopetition. For instance, Lavie relies on the ‘motivation for opportunism’ argument to explain why firms may capture less value when their partners are competitors. Opportunism is assumed to be greater because coopetition partners have “[greater] motivation to increase their share of relational rents” (2007: 1194). Similarly, Gnyawali & Park (2009) highlight opportunism as a significant cost of coopetition, arguing that partners’ capability for opportunism is a dilemma arising from resource potential in coopetition. Park & Ungson focus on traditional TCE logic and argue that uncertainty “causes a high level of transaction costs as partners adopt various contractual stipulations to avoid opportunistic hazards” (2001: 42). These three papers, emphasizing motivation, capability, and uncertainty respectively, are illustrative of a much larger body of literature that assumes heightened opportunism in coopetition.

3.4.2 Conflicting findings regarding opportunism in coopetition

Those that have directly investigated the issue of opportunism in coopetition have arrived at conflicting findings. Some provide rationale for heightened opportunism in coopetition, while others develop arguments for reduced opportunism. Drawing from TCE, Park & Russo (1996) argue their finding of higher joint venture failure rates among coopetition partners occurs due to heightened opportunism in coopetition. They suggest that the simultaneous presence of competition alongside cooperation creates “incentives to act opportunistically [that] appear to motivate actions that threaten and frequently undermine joint ventures” (Park & Russo, 1996: 887).

This finding directly conflicts with other research suggesting that opportunism is reduced in coopetition. Shipilov (2009) relies on multipoint competition logic, which itself incorporates aspects of competitive dynamics, to argue that increased performance in coopetition is facilitated by reductions in opportunism. The basis for this argument is that market commonality facilitates opportunism-reducing mechanisms through informal routines and reciprocity in coopetition (e.g., ‘live and let live’; Edwards, 1955). Another finding that market commonality between cooperative partners leads to lower adoption rates for formal safeguards against opportunism also supports this perspective (Ryu & Reuer, 2016).

3.5 Research gaps

The widespread assumption in the literature that opportunism is heightened in coopetition, as well as the conflicting findings that exist, expose two research gaps. The first gap is the failure of extant research to explain coopetition dynamics, which leads to the second gap, constrained theoretical development regarding value creation in coopetition.

3.5.1 Failure to explain coopetition dynamics

In its current state, the coopetition literature is unable to explain coopetition dynamics as they are observed in practice. Coopetition has emerged as a broadly popular approach in practice and pursuit of coopetition is rising in industries including semiconductors (Hagedoorn, 1993; Srivastava & Gnyawali, 2011; Stuart, 2000), biotechnology (Quintana-Garcia & Benavides-Velasco, 2004), and communications (Ansari et al., 2016; Fernandez et al., 2014; Pellegrin-Boucher et al., 2013). These relationships frequently proceed without the formal safeguards that TCE suggests are necessary to constrain

opportunism (Ryu & Reuer, 2016). This raises doubts about the validity of existing literature regarding opportunism and raises a fundamental question: Why is pursuit of coopetition rising without formal safeguards if opportunism is heightened in coopetition as the literature widely assumes?

Industry observations offer strong evidence that existing theory — dominated by the assumption of opportunism outlined — has significant limitations for explaining coopetition dynamics. “Theory is the answer to queries of why” (Sutton & Staw, 1995: 378) and a hallmark of good theory is that it facilitates explanation as to why a phenomenon occurs as it does (Whetten, 2009). Good theory is important because it facilitates explanation and represents a field’s “core knowledge capital” (Whetten, 2009: 218). In the coopetition literature with regard to opportunism, ‘good theory’ is clearly lacking. To the contrary, a largely unchallenged assumption about opportunism has created a blinkered field of vision and constrained theoretical development. The development of (good) theory in an emerging area like coopetition is critical because it helps to build understanding of a new and complex phenomenon about which relatively little is known.

This critical gap is compounded by conflicting findings offered by the few studies directly examining opportunism in coopetition. These studies employ TCE and multipoint competition theory respectively to explain heightened opportunism (Park & Russo, 1996) and reduced opportunism (Ryu & Reuer, 2016; Shipilov, 2009) in coopetition. Yet key theories underpinning coopetition, competitive dynamics (inter-firm competition) and the RBV (inter-firm cooperation) are largely overlooked. As I seek to address this gap in the

following chapter, I will show how both these theories are central to explaining coopetition dynamics.

In the current literature, conflicting findings aggravate the constraint on theoretical development because researchers have tended to align with one view (mostly the ‘heightened opportunism’ view) without any consideration the other and often without acknowledging this choice. This takes attention away from resolving the conflict and explaining underlying reasons why both sides of this conflict exist.

3.5.2 Constrained theoretical development regarding value creation in coopetition

Second, and despite the potential for value creation outlined in Chapter 2, it is not possible to achieve a systematic understanding of value creation in coopetition without good theory regarding opportunism in coopetition. Opportunism impedes value creation by driving holdup risks, inhibiting antecedents of value creation, limiting inter-partner resource-sharing, and reducing the resources available for value creation (Dyer, 1997; Dyer & Singh, 1998; Heide & Miner, 1992; Skarameas et al., 2002). Therefore, until opportunism in coopetition is adequately understood, the constraint on theoretical development regarding value creation will persist.

3.6 Objectives and research questions

These gaps motivate the two research objectives that my dissertation addresses. Each research objective maps onto a specific research question.

First, I set out to develop better theory regarding opportunism in coopetition. This includes explanations for the basis of conflicting findings in the literature. It is achieved by

examining the effect on opportunism when inter-firm competition and inter-firm cooperation occur simultaneously between firms. Opportunism has emerged as a seminal issue within inter-firm cooperation (Heide & John, 1992: 1982; Hennart, 1990; Kogut, 1991; Parkhe, 1993), so this research will probe the causal effects of introducing inter-firm competition, indicated by market commonality, into the relationship. This leads to my first research question:

1. What is the effect of market commonality on opportunism in cooperation?

Second, and building from my first objective, I explore the implications of opportunism in cooperation for value creation in cooperation. Although the conceptual development in Chapter 2, as well as a mass of emerging research (Ansari et al., 2016; Garrette et al., 2009; Gnyawali & Park, 2011), suggest that cooperation has significant value creation promise, this is at odds with the widespread assumption of heightened opportunism in the literature. Therefore, having clarified opportunism in cooperation, an important next step is to examine the subsequent effect on value creation. This leads to my second research question:

2. What influence does the effect of market commonality on opportunism have on firm value creation from cooperation?

3.7 Chapter summary

In Chapter 3, I have explained the two research gaps that my dissertation will address. These are (1) failure to explain cooperation dynamics and (2) constrained theoretical development regarding value creation in cooperation.

I begin by reviewing the important aspects of transaction cost economics theory, from which the concept of opportunism originates. Opportunism is damaging to inter-firm cooperation because it raises transaction costs while obstructing value creation. In the coopetition literature, I explain that opportunism is widely assumed to be heightened for three reasons: firms are motivated to behave opportunistically, capable of behaving opportunistically, and simultaneous inter-firm competition and cooperation introduces additional uncertainty to the relationship. The few studies examining this issue directly have reported conflicting findings, but researchers have tended to adopt the assumption of heightened opportunism at the expense of exploring reasons for this conflict.

The first research gap arises because the dominant assumption of heightened opportunism in coopetition is at odds with industry evidence. Pursuit of coopetition is rising in practice (Harbison & Pekar, 1998; Gnyawali & Park, 2009) and often proceeding without formal safeguards to constrain opportunism (Ryu & Reuer, 2016). This suggests that existing theory, espousing heightened opportunism, has significant limitations for explaining coopetition dynamics. Relatedly, as a result of the implications of opportunism for value creation, it is not possible to develop a systematic understanding of value creation without clarifying opportunism. This leads to the second research gap. The chapter concludes by outlining the objectives and research questions that emerge from these gaps.

Two theories, competitive dynamics (Chen et al., 1992; Baum & Korn, 1996; Smith et al., 1992) and the RBV (Barney, 1991; Lavie, 2006) are at the heart of how inter-firm competition and cooperation are understood but have been largely overlooked to address this issue. Given that these explain the two constituent elements of coopetition, it is unsurprising that they are enlightening with regard to coopetition dynamics. In Chapter 4,

I build from these theories to develop five hypotheses that are capable of answering the research questions I have outlined.

Chapter 4: Conceptual Development

4.1 Chapter introduction

The previous chapter identified two research gaps that require further development. The first gap is the absence of good theory to explain coopetition dynamics, which leads to the second gap, limited theoretical development regarding value creation in coopetition. I identified two research objectives to address these gaps and then articulated two research questions. In this chapter, with the purpose of satisfying the objectives by answering the research questions, a conceptual model is developed and five hypotheses are advanced.

The chapter begins by unpacking the concept of action-response dyads in competitive dynamics (Baum & Korn, 1999; Caves, 1984; Chen & MacMillan, 1992; Chen & Miller, 1994; Chen, 1996) (Section 4.2). I explain how response — depending on awareness of an action, motivation to respond, and capability of responding — determines the attractiveness of the action (Chen, 1996; Chen & Miller, 1994). Applying this logic to opportunism, I argue that scope for partner retaliation determines opportunism in coopetition. Through awareness, motivation, and capability, I explain why market commonality increases scope for partner retaliation, which reduces opportunism in coopetition (Section 4.3).

This suggests a negative effect of market commonality on opportunism, but extending the analysis to the RBV (Barney, 1991; Lavie, 2006), I propose that the effect reverses at high levels of market commonality. When market commonality is high, firms must appropriate

value from many of the same markets, which reduces the rarity of jointly developed resources. Opportunism helps the firm to preserve the rarity of jointly developed resources, which increases rewards from behaving opportunistically. Consequently, I hypothesize a curvilinear, U-shaped effect of market commonality on opportunism, where low and moderate levels of market commonality are negatively associated with firm opportunism but this reverses at higher levels of market commonality.

Extending this effect to consider the influence on value creation, I hypothesize that opportunism has a negative effect on firm value creation from cooperation (value creation will increase in line with reductions in opportunism and vice versa). This produces an inverted U-shaped effect of market commonality on value creation. To validate the logic underlying these predictions and enable fine-grained analysis, I also introduce two additional constructs, market rivalry and repeated cooperation, which have important negative moderating effects on the main relationship (Section 4.4).

In the next section, I begin developing the conceptual model by explaining the action-response dyad and its central role in competitive dynamics.

4.2 The action-response dyad in competitive dynamics

Action-response dyads shed light on the role of potential competitive responses and their influence on competitive actions (Baum & Korn, 1999; Caves, 1984; Chen & MacMillan, 1992; Chen & Miller, 1994; Chen, 1996). An action is a specific and detectible competitive move while a response is a specific and detectible countermove prompted by an initial action (Baum & Korn, 1999; Chen & Hambrick, 1995; Chen & MacMillan, 1992; Chen & Miller, 1994; Chen & Miller, 2012). Actions and responses are “the level

that actual competitive engagement occurs...” and therefore represent the building blocks of competitive dynamics (Chen & MacMillan, 1992: 541). Action-response is a basic and concrete level micro-analysis of competitive interaction that complements the economic forces type ‘macro analysis’ of competitive actions (e.g. Porter, 1980).

The study of action and responses has its basis in game theory, which offers a framework for rationalizing observed behavior when multiple actors have interdependent outcomes (Axelrod, 1984; Oye, 1986). Often focused on short-term ‘tit for tat’ interactions, game theory illustrates how the fates of individual actors are intertwined because, where the behavior of one actor affects the outcomes or opportunities available to other actors, there are incentives for other actors to respond – either in support or opposition (Brandenburger & Nalebuff, 1996).

At the firm level, game theory is applied to understand how payoffs for one firm’s action depend on the responses of other firms. These can be framed through well-specified economic models, such as repeated iterations of a Prisoner’s Dilemma (e.g., Axelrod, 1984). Where responses are capable of altering the payoffs available from a given action, a firm is forced to consider a potential action in terms of the responses it could invite (Hill, 1990; Parkhe, 1993). The application of this game theoretic logic to the current research context (i.e., engagements between for-profit firms) occurs has evolved within the literature on competitive dynamics (e.g., Chen & Miller, 1994). The core insight of the action-response literature is that actions must be considered in terms of the potential responses they may invite. Responses are important because they negate the intended benefits of an action and invite costly conflict, thereby limiting the ultimate effectiveness of the initial action (Chen & MacMillan, 1992; Chen & Miller, 1994). As long as

responses are lacking, the firm will find it easier to achieve the intended benefits from its actions (Chen & Miller, 1994; MacMillan, McCaffery, & Van Wijk, 1985). However, as responses increase, the firm will face more and more obstacles to achieve its intended benefits (Chen & Miller, 1994).

Responses may not only nullify an action and impede the intended benefits, they may also create the need for counter-responses (Chen & Miller, 1994; Lamberg, Tikkanen, Nokelainen, & Suur-Inkeroinen, 2009). Counter-responses are accompanied by costs because they absorb resources that may otherwise be employed to pursue benefits in other areas. Consequently, a potent response may leave the firm worse off than they were before their initial action (Chen & Miller, 1994; Porter, 1980). Thus, the attraction of an action becomes less as the likelihood of response increases (Chen, 1996; Chen et al., 1992; Chen & MacMillan, 1992; Chen & Miller, 1994; MacMillan et al., 1985; Porter, 1980; Smith et al., 1992) and an attacker is less likely to attack a rival who is more likely to respond (Baum and Korn, 1996; Chen, 1996; Chen & Miller, 1994).

To explain the likelihood of competitive response, the behavior of the defending firm is paramount (Chen & Miller, 1994). The defender's behavior, and thus the likelihood of competitive response, is determined by three behavioral drivers: awareness of the initial action, motivation to respond, and capability of responding (Chen, 1996; Chen & Miller, 1994). The awareness – motivation – capability (AMC) framework was formalized by Chen & Miller (1994). Building on Vroom's (1964) expectancy-valance framework, the pair sought to develop a model that minimized the likelihood of response to competitive actions. They argued that likelihood of response depended on the subjective value placed on successfully executing a response (motivation), the probability that a successful

response could be achieved (capability), and the visibility of the initial action (awareness). A defender will not be able to respond to a competitive action unless it is aware of the action, motivated to respond, and capable of responding (Chen, 1996). On the flipside, likelihood of response increases in line with increases in awareness, motivation or capability.

The first driver of competitive response, awareness refers to whether a competitive action is detected by another firm (Chen 1996; Chen & Miller, 1994). A rival who is unaware of a competitive action will not be able to respond. Action visibility, leading to awareness, is a tacit precondition to the expectancy-valence framework (Chen & Miller, 1994) and a pre-requisite for any response (Chen, 1996).

The second driver of response, motivation refers to the subjective value ('valence') associated with successful execution of behavior. Motivation to respond is greatest when the threat is significant: when the defender perceives that something important is at stake (Chen & Miller, 1994; Vroom, 1964). In such situations, the 'valence' of a response is the anticipated reward from nullifying an action. The more potent the action, the greater the valence.

The third driver, capability, refers to the probability of successful execution (Vroom, 1964; Chen & Miller, 1994). Successful execution is determined by two factors: the firm's competency to act and the firm's opportunity to act (Chen & Miller, 1994; Prince & Simon, 2009). Irrespective of awareness or motivation, likelihood of a response is low unless the responder is capable of executing.

AMC is widely applied in the literature to understand and predict a range of competitive properties, such as subjective perceptions of competition (Kilduff, Crossland, Tsai, & Krackhardt, 2010), counter-responses (Lamberg et al., 2009), broad competitive repertoires (Ferrier, 2001), and competitive tension (Chen, Tsu, & Tsai, 2007). In the next section, I extend its utility to build insights regarding opportunism in cooperation.

4.2.1 Implications for firm opportunism

At present, potential responses are not considered as a determinant of opportunism in cooperation. In Chapter 3, I explained that opportunism is assumed to be heightened in cooperation due to firm motivation, firm capability, and uncertainty in the environment. This emphasizes the ‘action’ side of the dyad. But potential responses are critical because they negate the intended benefits of opportunism. Where potential responses are significant, the firm is less likely to behave opportunistically because the likelihood of achieving the intended benefits from opportunism are less and the potential costs are greater (e.g., Baum & Korn, 1996; Chen, 1996; Chen et al., 1992; Chen & MacMillan, 1992; Chen & Miller, 1994; MacMillan et al., 1985; Porter, 1980; Smith et al., 1992). To date, responses to opportunism are overlooked in the literature.

Much of my conceptual development is dedicated to remedying this deficit. I unpack potential responses against opportunism and argue that, insofar as partner responses are significant (henceforth scope for partner retaliation), opportunism in cooperation will be reduced. Partner’s scope for retaliation to opportunism depends on three factors: awareness of the opportunistic behavior, motivation to retaliate, and capability to retaliate (e.g., Chen, 1996; Chen & Miller, 1994; Young, Smith, Grimm, & Simon, 2000). The

partner will not be able to retaliate to opportunism unless it is aware of the opportunistic behavior, motivated, and capable of retaliating. As awareness, motivation, and capability rise, so too does the scope for partner retaliation to opportunism (e.g., Chen, 1996; Chen & Miller, 2012).

4.3 Market commonality and opportunism

Opportunism is a seminal issue within inter-firm cooperation (Heide & John, 1992: 1982; Hennart, 1990; Kogut, 1991; Parkhe, 1993), so to explain scope for partner retaliation to opportunism, I will probe the causal effects of introducing inter-firm competition, indicated by market commonality, into the relationship. I draw from two theories to explain the effect of market commonality on opportunism: competitive dynamics (Baum & Korn, 1999; Chen & Miller, 1994; Chen, 1996) and the RBV (Barney, 1991; Lavie, 2006). I begin with competitive dynamics, specifically the AMC framework (Chen & Miller, 1994), to illustrate how market commonality increases partner scope for retaliation, which reduces opportunism. I expect this negative effect to occur at low and moderate levels of market commonality. Proceeding to the RBV, I explain how high market commonality reduces the rarity of jointly developed resources, which increases the rewards of opportunism. As a result, I anticipate that high market commonality will have a positive effect on opportunism. This leads me to hypothesize a curvilinear U-shaped effect of market commonality on opportunism.

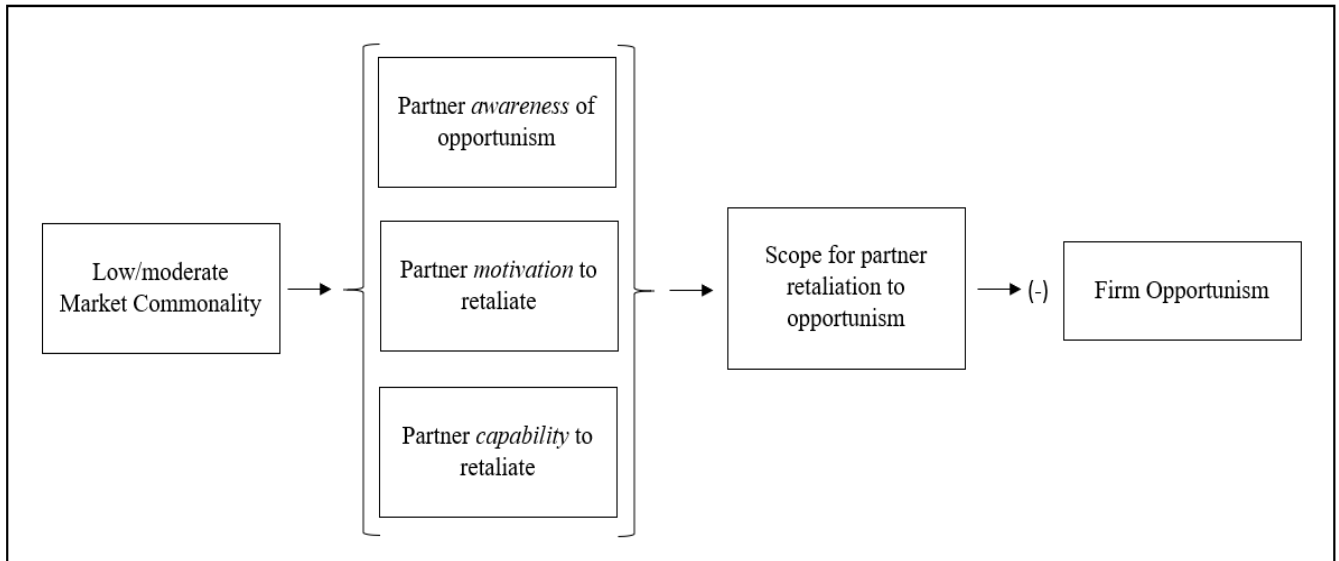
For conceptual and empirical precision, I focus on firm opportunism within a dyadic cooperation relationship in a ‘for-profit’ context (e.g., Bengtsson & Kock, 2000; Gnyawali & Park, 2011; Ketchen et al., 2004). Market commonality, arising from inter-firm

competition, is a firm-level construct referring to the proportion of the firm's markets in which it encounters a given competitor (Chen, 1996). Opportunism is defined as "self-interest seeking with guile" (Williamson, 1979: 234), including lying, cheating, stealing, deception, and evading obligations (Lumineau & Quélin, 2012; Luo, 2006a: 2006b).

4.3.1 Competitive dynamics

Drawing from competitive dynamics, I now explain why low and moderate levels of market commonality are hypothesized to reduce opportunism in competition. Opportunism depends on scope for partner retaliation, which itself is determined by partner awareness of opportunism, motivation to retaliate, and capability to retaliate. I argue that market commonality establishes a base level of awareness and motivation, while it increases capability to retaliate. Therefore, I propose that, up to a point, market commonality will reduce opportunism. The mechanisms underlying this proposed effect are laid out in Figure 4.1. I will now unpack the expected influence of market commonality on each dimension of the AMC framework.

Figure 4.1: Effect on opportunism when market commonality is low/moderate



Awareness refers to whether firm opportunism is detected by the partner (Chen 1996; Chen & Miller, 1994). Market commonality establishes a base level of awareness because the partner has clear incentives to monitor the firm’s behavior to detect opportunism (Amir, Lavie, & Hashai, 2017; Yu & Cannella, 2007). As the firm is present in at least some of the partner’s markets, the firm’s behavior directly affects the partner’s superiority (c.f., Porter, 1985). Therefore, the partner will pay greater attention to the firm’s behavior (Baum & Korn, 1999; Jayachandran, Gimeno, & Varadarajan, 1999) and so is more likely to detect opportunism. In addition, market commonality leads to overlapping dominant logics between the firm and the partner. Through their common markets, the partner develops deep understanding of the firm’s competitive behavior and priorities (Boeker, Stephan, & Murmann, 1997; Dussauge et al., 2000; Gnyawali & Park, 2009; Stephan & Boeker, 2001). This makes the firms actions more visible to the partner and makes it easier

for the partner to detect opportunism. Consequently, market commonality establishes a base level of partner awareness of opportunism.

Motivation refers to the subjective value associated with successful retaliation to opportunism (Chen & Miller, 1994). The value of retaliation is the anticipated reward from nullifying opportunism, so the partner has high motivation to retaliate when the subjective cost of opportunism will be great. Motivation to retaliate is a function of the centrality of attack (Chen & Miller, 1994) – the extent to which it affects the firm’s overall interests. Market commonality establishes a base level of partner motivation to retaliate because the partner’s superiority depends on the firm’s behavior (Baum & Korn, 1999; Chen, 1996; Gimeno & Woo, 1996a). A firm who uses opportunism to advance their own market interests does so at the expense of the partner, who is pursuing an incompatible position. The costs of opportunism for the partner include damage to their position in common markets. Consequently, partners with market commonality are motivated to vigorously defend their advantages by retaliating with speed and aggressiveness (e.g., Young, Smith, Grimm, & Simon, 2000; Yu & Cannella, 2007).

Capability refers to the probability of successful retaliation (Chen & Miller, 1994; Vroom, 1964). Probability of successful retaliation is determined by two factors: the firm’s competency to retaliate and opportunity to retaliate (Chen & Miller, 1994; Prince & Simon, 2009). Both these factors are increased by market commonality.

Competency to retaliate is increased because market commonality increases partner understanding of the firm’s behaviors and priorities (Boeker et al., 1997; Yu & Cannella, 2013). Market commonality increases the partner’s underlying resource potential relative

to the firm (Dussauge et al., 2000; Gnyawali & Park, 2009), which increases the speed of partner retaliation and facilitates more potent retaliations (Gimeno, 1999; Prince & Simon, 2009; Yu & Cannella, 2007). As a result, the partner is equipped to retaliate in a way that maximizes negative consequences for the firm (McGrath, Chen, & MacMillan, 1998).

Opportunity to retaliate also increase with market commonality. In market environments, market commonality leads firms to ‘forbear’ from aggressive behavior because opportunities for a victim to retaliate are extensive (Gimeno & Woo, 1996a; Prince & Simon, 2009; van Reeve & Pennings, 2016; Yu & Cannella, 2013). Retaliation may take place in the focal market, but also in any other markets that the victim shares with the firm. Thus, the more common markets (i.e., market commonality), the greater the scope for partner retaliation. Similarly, in cooptation, a partner who suffers firm opportunism may retaliate through competitive escalation in any, or all, of the firm’s common markets. As a result, the partner’s opportunity to retaliate increases in line with the firm’s market commonality.

Thus far I have argued that the firm’s market commonality increases scope for partner retaliation, which reduces opportunism in cooptation. This occurs because firm market commonality establishes a base level of partner awareness of opportunism and a base level of motivation to retaliate, while increasing capability to retaliate. The mechanisms underlying this effect are summarized in Table 4.1.

I expect this negative effect will hold at low and moderate levels of market commonality. At high levels of market commonality however, I expect the effect to reverse and market

commonality to have a positive effect on opportunism. I will now draw from the RBV to explain the rationale behind the positive effect of high market commonality.

Table 4.1: Role of market commonality in partner’s awareness, motivation and capability

Awareness of opportunism	Motivation to retaliate	Capability to retaliate
<p><i>Base level established by:</i></p> <ul style="list-style-type: none"> • impetus to monitor opportunism • deep understanding of the firm’s behavior 	<p><i>Base level established by:</i></p> <ul style="list-style-type: none"> • interdependence between the partner’s superiority and the firm’s behavior 	<p><i>Increased by:</i></p> <ul style="list-style-type: none"> • competence to retaliate to opportunism • opportunity to retaliate to opportunism

4.3.2 The resource-based view

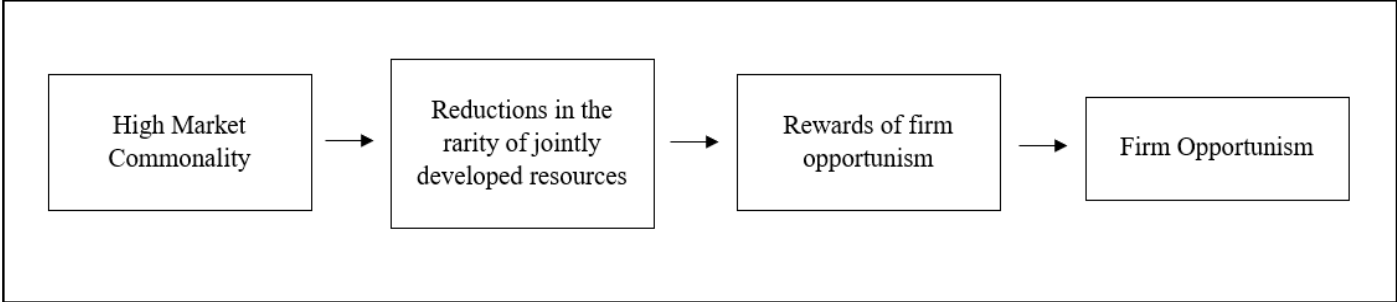
Coopetition is a unique type of competitive relationship in that value creation, such as technological development (Ansari et al., 2016; Garrette et al., 2009; Gnyawali & Park, 2011), is fundamental to the engagement. Yet competitive dynamics is characterized an underlying zero-sum logic, whereby gains for one firm occur at the expense of another and inter-firm engagements are not perceived as a source of value creation. The RBV enables systematic analysis of the value creation dimension of coopetition relationships and the potential effects it may introduce regarding opportunism.

The RBV views rare, valuable, inimitable, and non-substitutable resources (Barney, 1991) that are heterogeneously distributed and not easily tradeable (Dierickx & Cool, 1989; Wernerfelt, 1984) as the source of value creation. The external RBV (Dyer & Singh, 1998;

Lavie, 2006) suggests that some critical resources and capabilities may span firm boundaries and extend to the firm’s external relationships (Cassiman et al., 2009; Dyer & Singh, 1998; Garrette et al., 2009). Though they are accessed by multiple firms, these resources and capabilities may still satisfy the pre-conditions for value creation (valuable, rare, inimitable, and non-substitutable) within their wider industry context (e.g., Dyer & Singh, 1998; Lavie, 2006; Rai, 2016).

I draw from the RBV to argue that high market commonality has a positive effect on opportunism because it reduces the rarity of jointly developed resources. This increases the rewards of using opportunism to ‘get ahead’ of the partner and preserve the rarity of jointly developed resources in common markets. As a result, where market commonality is high, opportunism is expected to be increased. These arguments, summarized in Figure 4.2, are now unpacked.

Figure 4.2: Effect on opportunism when market commonality is high



Any degree of market commonality has some negative consequences for the rarity of jointly developed resources but such consequences become acute when market commonality is high. High market commonality reduces the rarity of jointly developed resources because the firm encounters the partner most or all of its markets. This means

that its efforts to appropriate value from jointly developed resources frequently occur in markets where the partner is also active. In markets where the firm and the partner are active, both rely on the same jointly developed resources, which makes them less rare (they may be accessed by two market participants instead of one). Consequently, from the perspective of each firm, the opportunity to create firm-specific value is less because consumers also have the option of a closely related substitute (e.g., Wassmer & Dussauge, 2012).

When the rarity of jointly developed resources is reduced in this manner, rewards of opportunism increase. This occurs because opportunistic behaviors may allow the firm to get a first-mover advantage over the partner (e.g., Chuang, Dahlin, Thomson, Lai, & Yang, 2015; Yang, Zeng, & Zaheer, 2015). A first mover advantage refers to the competitive edge gained by a firm who enters a market first (Lieberman & Montgomery, 1988). In this case, by introducing jointly developed resources to the market before the partner, a first mover advantage allows the firm to maintain the rarity of jointly developed resources, at least for a period. Opportunism, such as strategically evading obligations to the partner, or making empty promises (Williamson, 1975), enables a firm to gain a first mover advantage. This increases its ability to create value from jointly developed resources. For example, where a firm can achieve their resource-based goals from the relationship before the partner, they may then evade their obligations by terminating the relationship and inhibiting the partner's achievement of their goals (Khanna et al., 1998). This obstructs the partner's speed to market, which enables the firm to gain a first mover advantage, maintaining the rarity of jointly developed resources and enabling the firm to create more value.

Greater rewards of opportunism are expected to drive increased opportunism. Therefore, in contrast to the negative effect of low and moderate levels of market commonality, high market commonality is predicted to increase opportunism. This produces a curvilinear U-shaped effect of market commonality on opportunism, where low and moderate levels of market commonality reduce firm opportunism but this effect reverses at high levels.

In the next section, I explain how market commonality is expected to influence value creation through its effect on opportunism.

4.3.3 Implications for value creation

Value creation is defined as the generation of additional benefits for the firm from a particular set of activities (Lavie, 2006; Rai, 2016; Ritala & Hurmelinna-Laukanen, 2009). Opportunism is anticipated to negatively affect value creation for the firm (e.g., Barthélemy, 2008; Das & Rahman, 2010; Gassenheimer et al., 1996; John, 1984; Lumineau & Quélin, 2012; Luo, 2006a: 2006b; Luo, 2007; Williamson, 1985: 1991). The negative effect of opportunism on value creation occurs because opportunism inhibits important antecedents of inter-firm value creation (Luo, 2006a: 2006b: 2007; Park & Russo, 1996; Park & Ungson, 2001). Factors such as trust, reciprocity, and managerial attention are diminished by opportunism in cooperation. These are critical sources of value creation, especially where objectives are ambitious and complex (Uzzi, 1999). Opportunism also requires that resources are deployed to design, monitor, and enforce formal safeguards, instead of being utilized for more productive purposes (Luo, 2006a: 2006b: 2007). As formal contracts are fundamentally incomplete and can never entirely pre-empt opportunism (Deakin & Wilkinson, 1998; Hart, 1988; Williamson, 1979), the freedom and

confidence with which resources are shared is less when opportunism is present (Dyer, 1997; Dyer & Singh, 1998; Heide & Miner, 1992; Skarameas et al., 2002).

By destabilizing inter-firm cooperation, opportunism reduces value creation through additional safeguarding (Williamson, 1991) and diminished resource sharing (Hill, 1990; Park & Russo, 1996). Consequently, a negative effect of opportunism on value creation is hypothesized.

4.3.4 Hypothesis 1, 2a, and 2b

Insofar as low and moderate levels of market commonality reduce opportunism, I expect it to generate increases in firm value creation. In contrast, under conditions of high market commonality where the effect is reversed and opportunism is increased, I expect value creation to be reduced. Therefore, I advance the following hypotheses:

***Hypothesis 1.** In coopetition, market commonality is curvilinearly related (taking an inverted U-shape) to firm value creation. Low and moderate levels of market commonality are positively associated with value creation and high market commonality is negatively associated with value creation.*

***Hypothesis 2a.** In coopetition, market commonality is curvilinearly related (taking a U-shape) to opportunism. Low and moderate levels of market commonality are negatively associated with opportunism and high market commonality is positively associated with opportunism.*

***Hypothesis 2b.** Opportunism is negatively associated with value creation.*

4.4 Moderators

The core mechanism for the hypothesized negative effect of market commonality on opportunism is increased scope for partner retaliation. To validate this mechanism and add further nuance to my analysis, I introduce two moderating constructs that are expected to negatively affect the relationship between market commonality on opportunism. The first moderator, market rivalry, is expected to *dampen* the effect of market commonality on opportunism (e.g., Huber, Fischer, Dibbern, & Hirschheim, 2013). The second, repeated cooperation, is anticipated *replace* the effect on opportunism. Thus, through two different mechanisms, I expect these constructs to negatively moderate the main relationship. I will now explain the rationale behind these moderators and advance a hypothesis for each.

4.4.1 Market rivalry

Market rivalry is a behavioral construct that refers to the frequency and aggression of rivalrous actions and reactions between firms in a market (Baum & Korn, 1999; Jayachandran et al., 1999; Prince & Simon, 2009). It is distinct from competition, which is a structural concept that emphasizes incompatible market positions (Porter, 1980). In both positive and negative forms, the effect of market commonality on opportunism is expected to be weakened by market rivalry.

The negative effect of market commonality on opportunism relies on scope for partner retaliation, which is less when market rivalry is high and greater when market rivalry is low. Scope for partner retaliation is less when market rivalry is high because there is less latitude for escalation of rivalry as rivalry is already escalated in common markets (Prince

& Simon, 2009). Through intensive sequences of actions, responses, and counter-responses, market rivalry causes firms to contest away benefits that may otherwise exist (MacMillan et al., 1985; Porter, 1980). Consequently, there are less remaining benefits that may be achieved through opportunism — and nullified through retaliation to opportunism. As a result, scope for partner retaliation is less when market rivalry is high.

Scope for partner retaliation is greater when market rivalry is low because the development and maintenance of low market rivalry incurs costs and takes time (Baum & Korn, 1999; van Wegberg & van Witteloostuijn, 2001). It may even suggest that some tacit mechanisms are already in place among competitors for limiting rivalry (Chuang et al., 2015; Edwards, 1955; Yu & Cannella, 2013). The costs of escalating rivalry with regard to damaging these costly mechanisms are significant and escalations are more potent because they are experienced more acutely by the firm (Prince & Simon, 2009; Wathne & Heide, 2000). Therefore, the scope for partner retaliation is greater when market rivalry is low.

When the effect of market commonality on opportunism is positive, the anticipated benefits that the firm can achieve from opportunism depends on the level of rivalry already present (e.g., Garrette et al., 2009; Lavie, 2007). By increasing the proportion of benefits that are contested away (MacMillan et al., 1985; Porter, 1980), market rivalry means that remaining benefits to be achieved through opportunism are less. When the benefits are less, the attractiveness of opportunism, and therefore firm pursuit of opportunism, is expected to be less. Consequently, the positive effect of market commonality on opportunism will be greater when market rivalry is low and less when market rivalry is high.

4.4.2 Hypothesis 3

I anticipate that market rivalry negatively moderates the effect of market commonality on opportunism:

***Hypothesis 3.** In coopetition, the relationship between market commonality and opportunism is negatively moderated by market rivalry. Market commonality has a weaker association with opportunism, both positive and negative, when market rivalry is high.*

4.4.3 Repeated cooperation

Repeated cooperation refers to the firm's history of past cooperative agreements with the partner (Villalonga & McGahan, 2005; Wang & Zajac, 2007; Zollo, Reuer, & Singh, 2002). Repeated cooperation is expected to replace the scope for partner retaliation against opportunism because it generates a different type of safeguard against opportunism. A history of repeated cooperation fosters relational mechanisms through trust, shared norms, and social relations, and creates strong disincentives against opportunism (Carson et al., 2006; Mellewigt, Thomas, Weller, & Zajac, 2017; Muthusamy & White, 2005). Often described as 'relational governance mechanisms' or 'relational contracts', they can be employed by the partner to coordinate firm behavior and deter opportunism (Cao & Lumineau, 2015; Dyer & Singh, 1998; Macneil, 1980; Poppo, Zhou, & Ryu, 2008; Mellewigt et al., 2017; Bolton & Dewatripont, 2005). Therefore, repeated cooperation weakens the negative effect of market commonality on opportunism, while also reducing the positive effect of high market commonality on opportunism.

There are three means by which repeated cooperation limits opportunism: trust, shared norms, and social relations (Cao & Lumineau, 2015; Carson et al., 2006; Dyer & Singh, 1998; Macneil, 1980). First, repeated cooperation is a ‘social institution’ that is capable of building trust (Blau, 1964; Gulati 1995a). Trust refers to “an expectancy of positive outcomes that one can receive based on the expected action of another party” (Bhattacharya, Devinney, & Pillutla, 1998: 462) and leads to expectations of continuity in the relationship (Poppo et al., 2008; Zajac & Olsen, 1993). Opportunism jeopardizes trust because it erodes the partner’s expectancy of positive outcomes from the firm’s actions (Gulati, 1995a; Gulati & Nickerson, 2008; Poppo & Zenger, 1998). Trust is time consuming and costly to establish, so costs of opportunism are greater when trust is present.

Second, repeated cooperation generates shared norms between the firm and the partner. Shared norms “provide a framework of references to guide firms to act in expected ways...” (Cao & Lumineau, 2015:17). They operate like mutual heuristic guidelines for the firm, specifying the behaviors that are appropriate versus those that are opportunistic (Mellewigt et al., 2017; Nelson & Winter, 1982). By establishing consensus regarding behavioral expectations and “a commitment to joint action” (Poppo & Zenger, 2002: 710), shared norms deter the firm from deviating from joint action to pursue self-interest through opportunism.

Third, repeated cooperation establishes social relations that motivate partners to venture beyond reasonable obligations in their cooperation (Blau, 1964; Cropanzano & Mitchell, 2005; Heide & John, 1992). Additional obligations constrain opportunism by creating informal, nonlegal penalties for the firm if it behaves opportunistically because a partner

may also cease its additional obligations (Macaulay, 1963). Social relations also facilitate problem solving and preserve communication between the firm and the partner, even in the face of adversity (Poppo & Zenger, 2002). Therefore, social relations increase the firms opportunities to focus on joint interests and creates disincentives against opportunism (Carson et al., 2006).

To the extent that both constructs limit opportunism, repeated cooperation is functionally equivalent to the effect of low and moderate levels of market commonality. This creates redundancy when they are concurrently present: one well-developed mechanism for limiting opportunism makes the other unnecessary and may even undermine its effectiveness (Gulati, 1995a; Huber et al., 2013; Li, Xie, Teo, & Peng, 2010). When market commonality (repeated cooperation) fulfills a safeguarding role against opportunism, repeated cooperation (market commonality) becomes a less important safeguard. For example, the same 'live and let live' norms of reciprocity available from market commonality (Edwards, 1955) are also available through repeated cooperation (Poppo & Zenger, 2002). In addition, market commonality undermines the strength of the deterrent from repeated cooperation and vice versa. For example, repeated cooperation may encourage a partner to be less strict in enforcing the market commonality retaliation mechanism to avoid ruining the cooperative base of relational mechanisms (e.g., Wang, Yeung, & Zhang, 2011). Therefore, repeated cooperation is expected to weaken the negative effect of low and moderate market commonality on opportunism.

A noteworthy contradictory argument would be that repeated cooperation could strengthen the negative effect of market commonality on opportunism; perhaps by promoting knowledge transfer or augmenting communication channels (e.g., Zhang &

Zhou, 2013). This type of complementary relationship is sometimes observed between repeated cooperation and another important safeguard of opportunism, formal contracts (Argyres, Bercovitz, & Mayer, 2007; Connelly, Miller, & Devers, 2012; Poppo & Zenger, 2002), but this a rather different context. When repeated cooperation interacts with formal contracts, repeated cooperation can instill confidence that enables partners to enter long-term, more detailed contracts (Poppo & Zenger, 2002; Ryall & Sampson, 2009). It is improbable that a similar effect would be observed between market commonality and repeated cooperation because, although firms have discretion regarding their formal contract specifications, there is less possibility of adjusting market commonality in this fashion. Market commonality is a structural characteristic that takes time to emerge and is molded by a much broader suite of strategic decisions (Chen, 1996). Additionally, the complementary potential between repeated cooperation and market commonality is less evident – both are informal, ambiguous, not enforceable by law, and rely on similar sociological norms (e.g., reciprocity). The complementary potential between repeated cooperation and formal contracts is much clearer – formal contracts (repeated cooperation) are a formal (informal) deterrent against opportunism that is transparent (ambiguous), and legally enforceable (not legally enforceable) (Cao & Lumineau, 2015). The strength of one is the weakness of the other (Huber et al., 2013), so the potential for one mechanism to address the limitations of the other is evident. Although the potential for a complementary effect was considered, substitution is a more appropriate prediction.

Having analyzed the negative effect of low and moderate levels of market commonality, I now turn to the influence of repeated cooperation on the positive effect of high market commonality on opportunism. Where high market commonality has a positive effect on

opportunism, repeated cooperation assumes a compensating role (Cao & Lumineau, 2015) that addresses the limitations of market commonality and constrains the positive effect. At high levels, market commonality no longer safeguards against opportunism, so repeated cooperation has unique advantages for limiting opportunism (e.g., Huber et al., 2013). Instead of scope for partner retaliation, repeated cooperation safeguards against opportunism by generating relational mechanisms which rely on trust, shared norm and social relations. Thus, the positive effect of high market commonality is expected to be weakened by repeated cooperation.

4.4.4 Hypothesis 4

As a result, I anticipate that repeated cooperation negatively moderates the effect of market commonality on opportunism:

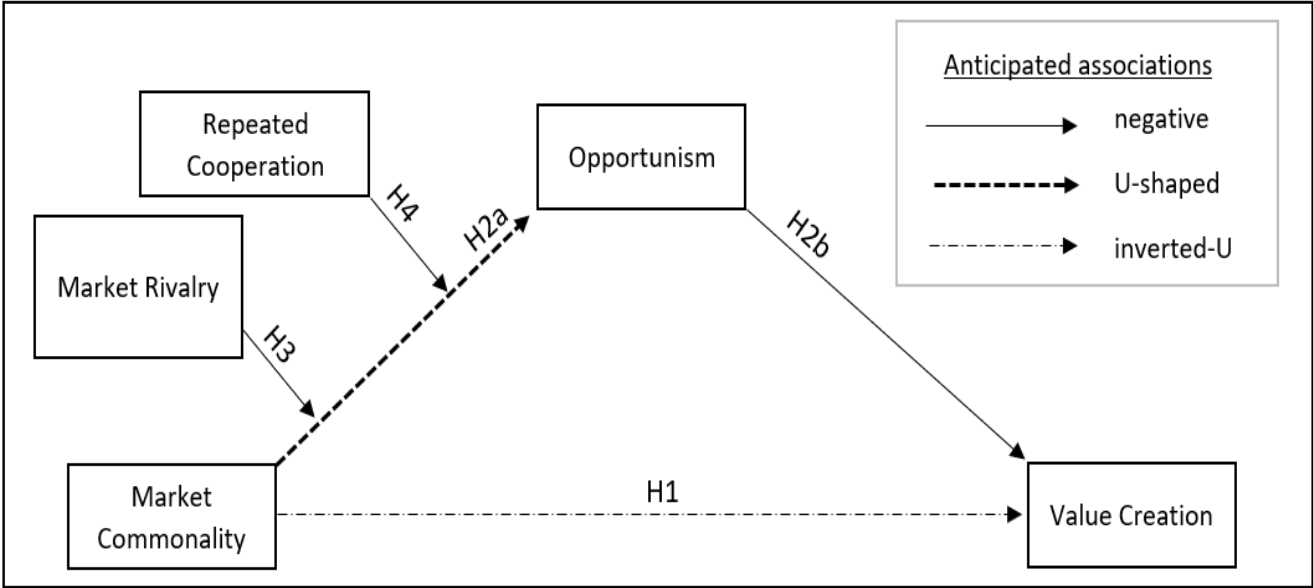
Hypothesis 4. In cooperation, the relationship between market commonality and opportunism is negatively moderated by repeated cooperation. Market commonality has a weaker association with opportunism, both positive and negative, when repeated cooperation is high.

4.5 Conceptual model

The conceptual model is laid out in Figure 4.3. Hypothesis 1 proposes a curvilinear, inverted U-shaped relationship between market commonality firm value creation. This occurs through a U-shaped effect of market commonality on opportunism (where low and moderate levels of market commonality reduce opportunism and high market

commonality increases opportunism) (Hypothesis 2a), and a negative hypothesized effect of opportunism on value creation (Hypothesis 2b). The effect of market commonality on opportunism is predicted to be negatively moderated by market rivalry (Hypothesis 3) and repeated cooperation (Hypothesis 4).

Figure 4.3: Conceptual model



4.6 Chapter summary

In this chapter, I have addressed the objectives and research questions from Chapter 3 by advancing a conceptual model with five hypotheses. Drawing from the logic of competitive action and response (Baum & Korn, 1999; Caves, 1984; Chen & MacMillan, 1992; Chen & Miller, 1994; Chen, 1996), I demonstrated how likelihood of response reduces the attractiveness of a competitive action. Extending this logic to coopetition, I argue that opportunism depends on scope for partner retaliation, which itself depends on partner awareness of opportunism, motivation to retaliate and capability to retaliate (Chen,

1996; Chen & Miller, 1994). Through its effect on each of these properties, I propose that market commonality increases scope for partner retaliation, which reduces opportunism in competition.

While this suggests a negative effect, I explained why it is appropriate to specify a curvilinear U-shaped relationship because the effect on opportunism turns positive at high levels of market commonality. Building on the RBV (Barney, 1991; Lavie, 2006), I explained how high market commonality reduces the rarity of jointly developed resources, which increases rewards from behaving opportunistically. Consequently, I hypothesized that low and moderate levels of market commonality are negatively associated with firm opportunism but this reverses at higher levels of market commonality.

I proceeded to consider the effect on value creation where I hypothesized that opportunism has a negative effect on value creation. In combination, the U-shaped effect of market commonality on opportunism and the negative hypothesized effect of opportunism on value creation led me to propose an inverted U-shaped effect of market commonality on value creation. The nuance of the conceptual model is augmented by illuminating two key moderators, market rivalry and repeated cooperation.

In the next chapter I begin the move from theory to data in order to test the conceptual model. I first consider research methodology, which constitutes the procedure I will adopt for generating knowledge (Blaikie, 2007).

Chapter 5: Methodology

5.1 Chapter introduction

In previous chapters, I have explained how the field of strategic management has evolved to the present-day study of coopetition. Two important gaps are identified in the literature: (1) the failure of extant research to explain coopetition dynamics and (2) constrained theoretical development regarding value creation in coopetition. These gaps have informed the objectives for this research which, in turn, map onto two research questions.

In Chapter 4, to address these research questions, I extended literature on competitive dynamics (Baum & Korn, 1996; Chen et al., 1992) and the resource-based view (Barney, 1991; Lavie, 2006) to advance five hypotheses. Chapters 6 and 7 operationalize and test these hypotheses. The purpose of this chapter is to outline the research methodology that underlies the empirical inquiry.

Any claim to develop and test theory places a responsibility on the researcher to adopt and express their stance in relation to their ontological and epistemological assumptions, and their approach to reasoning. The outcome of these methodological decisions cumulatively expresses the researcher's philosophy or worldview. This chapter deals with these issues, setting out why I decided to underpin this research with a critical rationalist research philosophy, consisting of a realist ontology, falsificationist epistemology, and deductive approach to reasoning.

This chapter is organized in six sections. I begin by explaining why philosophy is an important consideration (Section 5.2). This is followed by a discussion of ontology, which outlines the prominent standpoints of objectivism and subjectivism in the literature, before explaining the suitability of a cautious realist ontological position for the current research (Section 5.3). I proceed to outline of epistemological considerations (Section 5.4), where prominent assumptions associated with positivism and interpretivism are discussed, and the suitability of a falsificationist position is explained. The final methodological decision is the approach to reasoning, where I outline traditional deductive and inductive approaches, and explain why deductivism is aligned with my ontological and epistemological choices (Section 5.5). A cautious realist ontology, falsificationsist epistemology, and a deductive reasoning approach underpin a ‘critical rationalist’ worldview, the central assumptions of which are then discussed (Section 5.6). Chapter 5 concludes by reflecting on the implications of this research methodology for the subsequent choice of method (Section 5.7).

5.2 Research methodology

Research requires “a procedure, a logic, for generating new knowledge” (Blaikie, 2007: 8), to which the choice of method is subservient (Easterby-Smith, Thorpe, & Jackson, 2012). It is therefore necessary to understand and challenge core assumptions about the way the world works and what knowledge is (Saunders, Lewis, & Thornhill, 2009).

My research is heavily influenced by economic theory, where deep questioning of philosophical assumptions is rather uncommon. Instead, a stance of positivism is frequently assumed, often implicitly. Nonetheless, it remains important to reflect on

methodological choices — both explicit and implicit — and evaluate their suitability relative to alternatives (Johnson & Clark, 2006).

Rather than reflecting personal biases, a methodology is chosen because it is most suitable for tackling the current research problem (Creswell & Plano Clark, 2007). There are ontologically different views of knowledge and particular research problems may require that certain assumptions are either consolidated or relaxed (Creswell, 1994). There is no neutral observation point from which conflicting positions can be evaluated (Kuhn, 1962), so the purpose of this chapter is not to accept or reject ontological standpoints, but to explain the suitability of the position I have adopted for this particular research. Three important philosophical assumptions are now discussed: ontology, epistemology, and reasoning.

5.3 Ontology

Ontology refers to the nature of reality and existence, or what constitutes social reality (Blaikie, 2007; Easterby-Smith et al., 2012). The ontological extremes of objectivism and subjectivism stem from Classical Greek times with Plato and Aristotle (positivists) on one side and the Sophists (anti-positivists) on the other. Objectivism, also known as a positivist or realist ontology, depicts social entities within an objective and concrete reality that is external to researchers (Saunders et al., 2009). “Both natural and social phenomena are assumed to have an existence that is independent of the activities of the human observer” (Blaikie, 2007: 13). Subjectivism posits that social phenomena exist in multiple context-driven realities. A subjectivist view perceives that scientific laws are not simply external to the researcher but are created from social actors’ perceptions and

actions. The researcher is influenced by the phenomenon, but may also influence the phenomenon (Blaikie, 2007). Therefore, “what counts for the truth can vary from place to place and from time to time” (Easterby-Smith et al., 2012: 20). For instance, an objective view of firm culture perceives it as something that the firm controls, but a subjectivist view acknowledges that culture may be continually recreated through individual interpretations of social and physical factors (Saunders et al., 2009).

5.3.1 Cautious realism

This research adopts a type of objectivist ontology that is popularly termed ‘cautious realism’ (Blaikie, 2007). An objectivist ontology enables development of knowledge that is relevant across a variety of research settings. It assumes that there is a single reality, which facilitates emphasis on concrete and external truths. Therefore, knowledge can be meaningful beyond the context in which it is derived, which is more conducive to generalizable insights. An objectivist ontology is appropriate for the objectives of this dissertation because, in order to clarify the nature of opportunism in competition and the implications for value creation, insights with some generalizability will be most valuable.

Cautious realism views human perception as flawed, so the discovery of external truths remains open to confirmation and disconfirmation. Though cautious realism acknowledges that an external, concrete reality does exist (Guba, 1990), it asserts that “our ability to know it directly is impeded by the limitations of the human senses and the interpretative nature of observation” (Blaikie, 2007: 179). This is an important dimension of my ontological choice as it recognizes the difficulties associated with accessing complex firm constructs, such as opportunism, where it is often necessary to employ

indirect measures (e.g., Park & Russo, 1996; Ryu & Reuer, 2016; Shipilov, 2009). For these reasons, a cautious realist ontology, is selected as most appropriate for achieving the aims of this research.

5.4 Epistemology

Epistemology refers to assumptions about what constitutes acceptable knowledge and how one should come to know that knowledge (Hughes & Sharrock, 1997). It is concerned with the approach to accessing knowledge and with the degree of engagement between the researcher and the phenomenon under observation (Easterby-Smith et al., 2012). Positivism and interpretivism are prominent epistemological positions that are popularly treated as opposing extremes.

Interpretivism advocates that the researcher is inseparable from the phenomenon and that subjective approaches can generate an interpretive understanding (Collis & Hussey, 2003). Interpretivism is an umbrella term for multiple paradigms, approaches to data, and methods of data analysis (Punch, 1998), which are all concerned with understanding the subjective nature of the social world (Burrell & Morgan, 1982). Interpretivism facilitates the incorporation of multiple data sources but inconsistencies are not easily resolved, which inhibits generalizability (Easterby-Smith et al., 2012). An interpretivist position perceives knowledge as socially constructed and human interaction as fundamental to reality creation. Subjective interpretations are required to interpret the context where human action occurs, so they become a part of the research (Schwandt, 2001). Thus, the researcher is embedded and immersed in the phenomenon of interest (Hussey & Hussey, 1997).

In contrast, positivism assumes that knowledge is accessed through sensing regularities between observed events from which generalizable predictions can be deduced (Comte, 1853). Positivist epistemologies are closely aligned with objectivist ontologies and are sometimes assumed to be a required pair. Positivism is widely applied in social research to generate objective and quantifiable data (Burrell & Morgan, 1982). A pure positivistic perspective (e.g., empiricism) assumes that sensual experiences portray the world accurately and that any deficit between our perceptions and reality is accounted for by incomplete information; perhaps because the necessary technology to eliminate the deficiency does not yet exist. Knowledge comes from independent observations of an external reality and the researcher seeks to neither influence by nor be influenced by the world that they investigate. Valid knowledge is achieved “by generalizing from observed regularities between events” and “anything that we know about the world is true only if it can be put to the test of experience. Any scientific idea that cannot be confirmed by observation is meaningless and has no role in science” (Blaikie, 2007: 20). A purely positivistic epistemology perceives social research, where the researcher is not wholly external to the research, as “prone to employ warped logic and improper treatment of empirical data in order to support views they held prior to the investigation” (Gordon, 1991: 664). From a positivist perspective, the world is relatively unchanging and different levels of analysis can be understood independently (Saunders et al., 2009).

5.4.1 Falsificationism

I employ a falsificationist approach for the current research (Popper, 1959:1961), which is aligned with positivism, insofar as it shares the view that natural science methods can be applied in the social sciences. Similarly, a theory should be considered scientific if,

and only if, it is falsifiable (Popper, 1959). Theories that do not lend themselves to falsification are excluded as unscientific (Blaikie, 2007). However, despite many similar assumptions to positivism, falsificationism asserts that theories are invented to explain observations; not derived from them. Asserting that ‘proof’ or ‘truth’ is unachievable, falsificationism thus seeks to challenge and falsify hypotheses where possible. The object of science from a falsificationist perspective is to arrive at a point where theories are less bad (Popper, 1959).

Falsificationism is appropriate because it enables me to clarify opportunism in cooptation and address the current gaps in the literature. Falsificationism asserts that it is never possible to establish truth, so the closest one can get to truth is disproving false theories. Sensory experience is rejected as a secure basis for science because observations are always made within a pre-existing frame of reference. Therefore, I diverge from the positivistic assumption of phenomenalism, which asserts that what counts as knowledge is only what an observer can perceive by his or her senses (Blaikie, 2007). By acknowledging the limitations of human senses for observing opportunism, a falsificationist epistemology enables me to challenge bad theory, while at the same time accepting that social researchers may be impeded in pursuit of truth and that whole truth may be inaccessible (Lakatos, 1970; Popper, 1959).

Falsificationism also has high utility for resolving conflicting findings in the cooptation literature (Salovaara & Merikivi, 2015). By accepting non-disproved truths only temporarily, falsificationism accepts that researchers are in some ways active agents reaching beyond sensual experiences rather than passive observers. Partially complete theories may be temporarily accepted where they represent a better explanation for the

phenomenon under scrutiny. As opposed to waiting to observe regularities, a falsificationist “must impose regularities on the world” (Blaikie, 2007: 21). Tentative theories surviving rigorous tests without being disproved are temporarily accepted as knowledge. These tentative theories, once falsified, are replaced with the next best explanation.

A falsificationist epistemology can help to refine fundamental flaws regarding opportunism in coepetition before the literature evolves further and they become more widely adopted (Salovaara & Merikivi, 2015). With an opportunity to develop better explanations at this relatively early stage, it is possible to avoid a fate where “... much of the scientific literature, perhaps half may simply be untrue.” (Editor-in-Chief at The Lancet; quoted by Horton, 2015). To solidify the foundations of coepetition research and enable deeper understanding of value creation in coepetition, falsification enables my research to resolve disparities and contradictions at quite an early stage in the literature’s development.

Falsificationism asserts that, although theoretical verification is never possible, a single counterexample is logically conclusive because it establishes that a theory is false in universal form. Therefore, it is argued that falsificationism can provide definitive support for a falsity, but positivism can only offer partial support for a truth via observation. The black swan metaphor is popularly employed to distinguish between falsificationism and verificationism (i.e., positivism). Verificationism sets out to establish that ‘all swans are white’ by making inferences from observational data generated from a sample of swans. However, falsificationism argues that this is not aligned with deductive logic and amounts to inferring a universal law from a number of individual cases. Falsificationism might

accept ‘all swans are white’ as a tentative theory, up until a single non-white swan is identified. At this point, deductive logic requires that the theory ‘all swans are white’ is false. In its ‘naïve’ form, falsificationism asserts that this single piece of falsifying evidence is definitive.

A popular criticism of falsificationism centers on this ‘naïve application’, where although theoretical verification is never possible, conclusive falsity can be established by a single counterexample. Falsificationism assumes that “the so-called objectivity of science lies in the objectivity of the critical method... that no theory is beyond attack by criticism” (Blaikie, 2007: 115). Yet, because all observations require interpretation into theories, under falsificationist logic, the critical method itself cannot be objective. The process of operationalization is automatically interpretative (Hindess, 1977), making it logically impossible to definitively classify a theory as false based on a single piece of evidence. Falsifying evidence — as verifying evidence — can also be fallible (Salovaara & Merikivi, 2015).

A resolution to this popular criticism, and a more sophisticated application, is that while the logic of falsificationism may be incoherent for individual theories, broader groups of theories or ‘research programs’ mature over time (Lakatos, 1970). In the course of their development, research programs may incorporate some falsifying evidence. However, due to dynamism and interdependencies within these programs, an entire research program cannot be falsified by a single piece of evidence. Rather, only an entire program can falsify another. For this to occur, “it must explain all the content of its’ rival as well as predict novel findings that the rival deems improbable or impossible...” (Salovaara & Merikivi, 2015: 3). This resolution departs from an abstract discussion and grounds

falsification in historical evidence of scientific progress. It extends the remit of a falsificationist approach beyond rigorous efforts to generate negative findings, to the enhancement and/or clarification of literature. However, the central tenet of falsificationism is preserved — “sooner or later all the falsifying evidence must be addressed, and the theory must be made compatible with it” (Salovaara & Merikivi, 2015: 3).

5.5 Deductive reasoning

The two most common approaches to reasoning are deductive and inductive. Deductive research — theory testing — is closely aligned with a realist ontology and positivist epistemology. It begins with a conceptual structure before moving to empirical observations (Saunders et al., 2009). Deductive research employs theory to develop testable propositions; before operationalizing the proposition, testing the operationalized hypothesis, considering the outcome, and modifying theory if necessary. Inductive research — theory building — starts with data and then moves to theory. It is popularly conceptualized as a qualitative approach. Emphasis is placed on context and the researcher may employ a flexible structure that facilitates changes in direction during the research process, but it is more challenging to establish the applicability of findings outside of their empirical context (Malhotra & Birks, 2003).

To improve generalizability and align with my epistemological and ontological positioning, a deductive approach is most appropriate for this research. From the perspective of falsificationism, pure observations are impossible. While “observations may furnish evidence of regularities that need to be explained... the process of explanation

must begin with a tentative theory” (Blaikie, 2007: 116). Observations must be explained, but observations themselves are preceded by “the adoption of a frame of reference: a frame of expectations: a frame of theories” (Popper, 1972: 47). By moving from theory to data — or from the general to the particular (Hussey & Hussey, 1997) — my research will test explanations derived from existing theories rather than construct new ones (Bryman & Bell, 2007).

5.6 Critical rationalism

In combination, a cautious realist ontology, falsificationist epistemology and deductive reasoning approach are known as a ‘critical rationalist’ worldview (Blaikie, 2007). Where relevant insights are available from well-established literatures, such as competitive dynamics and the resource-based view, the assumptions of critical rationalism (Table 5.1) facilitate clarity regarding contradictory evidence and can help to address failure of extant literature to explain competition dynamics.

Table 5.1: Assumptions of a critical rationalist worldview

Naturalism: the logics of enquiry of the natural sciences can and should be applied in the social sciences.

Observation: the primary role of observation is theory testing – not theory development.

Independence: the researcher is independent from the researched.

Value freedom: the choice of what and how to study is determined by objective criteria as opposed to the interests of the researcher.

Hypothesis and deduction: science proceeds through a process of hypothesizing fundamental laws and then deducing what kinds of observations can best demonstrate the falsity of these hypotheses.

Causality: the ultimate aim is to derive better causal explanations and fundamental laws that explain regularities in firm behavior.

Generalization: to move from the specific to the general, it is necessary to select random samples of sufficient size to justify a modification of existing theory based on the outcome of the research.

Inaccessibility of truth: it is never possible to establish whether scientific theories are true. All that we can do is to eliminate false theories through conjecture and refutation.

Interpretation: observation requires interpretation; “we cannot see and observe our objects before we have thought about them” (Popper, 1961: 135).

Operationalization: concepts need to be defined in ways that enable facts to be measured quantitatively.

Reductionism: problems are better understood as a whole if they are reduced into the simplest possible elements.

*adapted from Easterby-Smith et al. (2012: 23) and Blaikie (2007)

5.7 Implications for research method

The assumptions outlined in Table 5.1 are the basis for subsequent consideration of a suitable method. The ideal method for these assumptions is a tightly controlled experiment, where all elements of treatment and control groups are identical except for the focal variables. Experiments are characterized by their high levels of prescription and extensive controls that eliminate as many alternative explanations as possible. In social science, true experiments have practical and ethical drawbacks (Easterby-Smith et al., 2012) and, for this research, it was challenging to find firms willing to be experimented upon. It is also difficult to establish sufficiently controlled environments so that replication is viable. Consequently, quasi-experiments, whereby firms are allocated to notional experimental or control groups, usually on the basis of pre-existing groupings, are more popular. Quasi-experiments offer similar benefits, including clarity, transparency, and repeatability, and facilitate relatively strong inferences where true experiments are unavailable (Easterby-Smith et al., 2012).

Under quasi-experimental conditions, stringent ontological assumptions regarding what constitutes objective data must be relaxed. In the absence of experimental data, I rely mainly on third-party archival data. Archival data is widely recognized as the most objective alternative for observing firm behavior when experiments are unavailable. By using data from multiple archival sources, I can measure a greater number of variables over a longer time period than might otherwise be practical, while remaining independent from the research setting. This enables me to collect comprehensive data on a large number of firms (relatively) quickly, which enhances the generalizability of my results (Easterby-Smith et al., 2012). Archival databases are “a valuable and generally reliable

(if not exhaustive) resource for the study of interorganizational relationships” (Schilling, 2009: 259). Archival data also limits risks of common methods bias, where observed ‘effects’ may be driven by the data collection process itself.

5.8 Chapter summary

In this chapter, I have outlined the critical rationalist worldview and the key assumptions underpinning this inquiry. I explained the need to consider research philosophy, before outlining the opposing ontological positions of objectivism and subjectivism. I then explained why a cautious realist ontology is appropriate for establishing generalizable knowledge and addressing the challenges faced by the current literature. I discussed epistemology and outlined the prominent assumptions of positivism and interpretivism. I then explained why a falsificationist position is chosen to balance the limitations of human senses against the existence of an objective reality. I proceeded to discuss why cautious realism and falsificationism are aligned with deductive reasoning. In combination, these choices underpin a philosophy known as ‘critical rationalism’ and I laid out the central assumptions of this perspective. Lastly, I explained that, although experimental data is most appropriate for this type of positivistic worldview, practical and ethical conditions lead me to rely on a quasi-experimental design employing third-party archival data. In the next chapter, the research design and the nature of the data and measures will be described.

Chapter 6: Research Method

6.1 Chapter introduction

This chapter continues the process of moving from theory to data. In Chapter 4, I advanced five hypotheses to address the research questions arising from a critical review of the literature. In light of the ontological and epistemological decisions discussed in Chapter 5, a quasi-experimental research design employing third-party archival data was deemed an appropriate method. Chapter 6 sets out the nuances of this approach including empirical context, data sources, and empirical measures.

The chapter begins with justification of why the global semiconductor industry, characterized by dynamic inter-firm competition and cooperation, is a suitable setting (Section 6.2). I then outline the data sources and decisions made during the collection process (Section 6.3), which generated a final sample of 464 firm observations. I proceed to explain the empirical measures that are derived to measure the core constructs: *Value Creation*, *Market Commonality*, *Opportunism*, *Market Rivalry*, and *Repeated Cooperation* (Section 6.4). I then highlight the importance of control variables and discuss those relevant for opportunism and value creation (Section 6.5). The chapter concludes with reflection on the improvements arising from the pilot study (Section 6.6).

6.2 Empirical background

The empirical setting for this study was the global semiconductor industry (SIC 3674). Semiconductor devices, ‘semiconductors’, or ‘semiconductor chips’, or are a set of

electronic circuits on a chip of semiconductor material, normally silicon. Anything that is computerized or uses radio waves relies on semiconductors, which makes them fundamental to almost all modern technologies. Acceleration in the pace of technological development means that demand for semiconductors has exploded in recent decades, with global sales growing from \$26 billion in 1987 to \$409 billion in 2017 (Statista, 2018). Six product segments can be identified in the semiconductor industry: discrete devices, analog integrated circuits, memory chips, microprocessors, microcontrollers, and application specific integrated circuits. An outline of each segment is provided in Table 6.1.

Table 6.1: Semiconductor product segments

Segment	Description	Important segment participants
Discrete devices	Semiconductors that can perform a basic function but cannot be divided into separate functional components. Individual components connected on a circuit board (e.g. transistors, rectifiers, and diodes).	Taiwan Semiconductor, Toshiba
Analog integrated circuits	Less dense in circuitry than digital integrated circuits. Used in the design of linear regulators, oscillators etc.	Texas Instruments, Analog Devices, STMicroelectronics
Memory chips	Electronic data storage devices implemented on a semiconductor-based integrated circuit. DRAMs, SRAMs, Flash Memory and EEPROM (Electrically Erasable Programmable Memory).	Intel, Samsung, Toshiba
Microprocessors	A minicomputer on a chip. Contains all functions of a central processing unit on a computer.	Intel, AMD, Qualcomm

Microcontrollers	Commodity integrated circuits – a small computer on a single integrated circuit. Designed for embedded applications (in contrast to microprocessors used in PCs). RAM and ROM.	Motorolla, Siemens, Texas Instruments, Intel
ASICs (Application Specific Integrated Circuit)	Complex ‘System on a Chip’ (SoC). SoC integrates microcontrollers (or microprocessors) with advanced peripherals such as graphics or WiFi for a particular use. Can include entire microprocessors, memory blocks, and other building blocks.	Altera, Agere Systems, STMicroelectronics

Three reasons were central to my decision to choose the global semiconductor industry as a suitable empirical context. One was that the semiconductor industry is a highly innovative setting with a relentless pressure for smaller, faster, and cheaper devices. This generates extensive and dynamic cooperative activity (Oxley, Sampson, & Silverman, 2009; Stuart, 2000), especially for R&D, as firms must work together to meet objectives that they cannot achieve alone. Such agreements frequently cross-border or global in nature. For example, Sun Microsystems Inc. and Fujitsu Ltd. worked together closely across more than two decades to advance chips for network workstations (e.g., Scalable Processor ARChitecture; SPARC).

A second reason for my choice was that the industry’s idiosyncrasies creates a context where opportunism is a pressing concern. The global semiconductor industry is highly dynamic and competitive (Srivastava & Gnyawali, 2011), which increases both aspects of uncertainty: volatility and ambiguity. In addition, firms frequently rely on tacit knowledge to generate new value. Tacit knowledge is difficult to define, which renders formal safeguards less effective, while competitors with overlapping knowledge bases are

disproportionately well-equipped to identify, assimilate, and apply tacit knowledge (e.g., Cohen & Levinthal, 1990; Lane & Lubatkin, 1998), more so than other resources. Consequently, formal protections against opportunism may be less effective, while capability to behave opportunistically may be greater in the semiconductor industry.

A third reason for choosing the global semiconductor industry was that the underlying capabilities of semiconductor firms facilitate their participation in many other markets (e.g., electronics components, display, communications hardware etc.). This offers the opportunity to observe how opportunism is affected at a variety of levels of market commonality, ranging from extremely high (where a firm shares almost all its markets with the partner) to really low (where a firm shares very few of its markets with the partner). Technological giants active in the semiconductor industry (e.g., Toshiba) participate in an extensive variety of markets, including household audio and video equipment (SIC 3651), photographic equipment and supplies (SIC 3861), and electrical industrial apparatus (SIC 3629). In contrast, other firms concentrate exclusively on the semiconductor industry, such as Advanced Micro Devices or Advanced Risc Machines.

6.3 Sample and data

Data was collected from firms involved in dyadic cooperative R&D agreements from 1995-2010 where there was market commonality between partners and at least one partner was active in the global semiconductor industry. Preliminary alliance data was collected from SDC Platinum. In all cases, cooperative agreements (also referred to as alliances) were verified by multiple sources (e.g., Lavie, 2007) to confirm that those reported were actually formed (Phelps, 2003; Rahman & Korn, 2014). Market data was extracted from

the Center for Research in Security Prices (CRSP) database while financial indicators for all firms and global stock data was culled from Compustat. Verification of SDC data (e.g., alliance announcements), as well as data concerning future cooperation between partners and firm types was achieved through extensive search and analysis of SEC filings, as well as publications from the Factiva and Lexis Nexis databases, and direct contact with company contacts listed on alliance press releases.

The sample and time period were chosen because they increase the likelihood of electronic reporting of records and facilitate tracking of market performance for a global sample. SDC Platinum records alliance-level data and an initial search revealed 556 dyadic R&D agreements among public firms from 1995-2010, where at least one side of the dyad was active in SIC 3674. Alliances with pre-defined end points may produce abnormal behavior and unique contractual arrangements (Rahman & Korn, 2014; Reuer & Ariño, 2007) and therefore, along with duplicates in the SDC database, these were initially excluded; leaving 533 alliances. Dyads involving partners who filed for bankruptcy, merged with another firm, or were acquired during the period of interest were then excluded. In addition, alliances involving cross-ownership at any point during the research period (e.g., Intel and Micron Technology) were excluded. Firms reporting a name change but remaining otherwise the same during the research period were maintained (e.g., Matsushita became Panasonic and SGS-Thomson became STMicroelectronics). In some databases, it was necessary to manually correct the search procedure but, in others (e.g., LexisNexis), company search tools automatically accounted for name changes.

There was substantial sample attrition in the process of verifying firm information provided by SDC. The main issues occurred where (1) SDC had mistakenly labelled the

firm as publicly traded when they were not (e.g., Digital Projection Ltd, Head Invest Oy, MOSAID Technologies), (2) where the firm was not publicly traded on major exchanges (e.g., NASDAQ) but rather via over-the-counter stocks (pink sheets) and the requisite data was not accessible (e.g., Flexpoint Sensor Systems Inc., Triant Holdings Inc), (3) where additional searches revealed that the ‘firm’ was a joint venture rather than a sole entity, or (4) where new agreements reported by SDC were actually continuations of existing alliances. After excluding firms based on one or more of these issues and omitting observations without any market commonality between partners (markets are defined at the 4-digit SIC code level), 464 firm-level observations were captured in the final sample.

6.4 Measures

I now describe the measures developed for the five central constructs from the conceptual model: value creation, market commonality, opportunism, market rivalry, and repeated cooperation.

6.4.1 Value creation

An event study method (Fama, 1970; Fama, Fisher, Jensen, & Roll, 1969) was employed to measure value creation, which refers to the generation of additional benefits for the firm (Lavie, 2006; Rai, 2016; Ritala & Hurmelinna-Laukanen, 2009). This approach was chosen because it enabled me to pinpoint value creation that is attributable to a particular alliance. Broad performance measures (e.g., ROA) are frequently used to measure value creation in strategic alliances (Ariño, 2003) but they ultimately measure value creation across all of a firm’s alliances, as well as other activities, and therefore exhibit significant validity concerns (Rai, 2016). An event study analysis isolates the stock price bump

associated with a specific alliance announcement. This stock price bump is interpreted as a reflection of the additional value that the market anticipates the firm will generate through the alliance. This effectiveness in measuring value creation that may be directly attributed to the alliance is an important advantage of the event study method (Amicia, Fiordelisib, Masalaa & Riccip, 2013; Anand & Khanna, 2000; Corrado, 2011; Kale, Dyer & Singh, 2002; Lavie, 2007; Oxley et al, 2009) and was a key determinant of my decision.

Prior to drawing inferences about value creation from an event study, it is worth noting two important points. Although risks of contamination from unrelated events are less than those of accounting measures, confounding threats cannot be entirely eliminated (McWilliams & Siegel, 1997; Oxley et al., 2009). In addition, an event study reports expected value creation rather than actual value creation (Lane & Jacobsen, 1995; Rai, 2016). Therefore, it assumes that the market has sufficient information to accurately assess the impact of an alliance (Kale et al., 2002). Specifically:

“... since accurate data on value created in JVs are onerous if not impossible to collect, scholars have looked at investors’ expectation of whether and how much the new JV will create value for the parent firms. Investors are a distinctive group of people who hold rich information about firms. Their judgement on whether a JV is expected to create value for parent firms and how the created value will be divided between partners is considered to have incorporated all available information.”

– (Gulati and Wang, 2003: 210)

The event study method enables me to isolate a fine-grained measure of alliance-specific value creation. Another important advantage is that this approach allows me to hold

constant many firm-specific characteristics (e.g., behavioral repertoires, internal capabilities), which are already incorporated in the firm's stock price. In addition, stock price measures are correlated with managerial assessments of alliance success, leading scholars to argue that the market does a good job of predicting value creation in cooperative agreements (Kale et al., 2002).

Of critical importance to a valid event study is determining the date when the alliance was announced. Anand & Khanna (2000) find that alliance announcement dates provided by SDC are often inaccurate. This was confirmed by my pilot analysis and a protocol was subsequently developed for identifying accurate announcement dates. The term 'alliance announcement date' refers to the date upon which an agreement to do a specified task was first communicated publicly to shareholders. Having identified alliance announcement reports from SEC filings (8-Ks, 10-Ks and 20-Fs), Lexis Nexis, and Factiva, I analyzed these reports to identify a validated announcement date. Where an alliance was announced after the day's trading had ceased, the next trading day was designated as the announcement day. In order of accuracy, I found that alliance announcement dates were effectively identified by news and wire reports, SEC filings, newspapers, trade magazines, and other publications (similar outcomes are reported by Anand & Khanna; 2000). In all cases, alliance announcement dates were cross-validated by at least two independent sources (e.g., Anand & Khanna, 2000; Lavie, 2007).

To estimate the abnormal stock price returns arising from the alliance, I modelled the 'normal' returns across an estimation period of 150 days (t-170 to t-21) (Oxley et al., 2009) and extracted the residuals when these estimates were applied during the test period. The test period is ultimately the period of interest: the timeframe where the abnormal

returns arising from the alliance can be observed. I measured two-day (t-1 to t), three-day (t-1 to t+1), and seven-day (t-3 to t+3) test periods (e.g., Amicia et al., 2013; Oxley et al., 2009). Capturing stock returns in the day(s) before the alliance announcement accounts for pre-announcement leakage of information (Anand & Khanna, 2000). I chose not to consider any test period greater than seven days (c.f., Anand & Khanna, 2000) because I could not identify any theoretical or methodological justification for doing so and it would increase the likelihood of confounding effects (Han, Oh, Im, Oh, Pinsonneault, & Chang, 2012; Oxley et al., 2009; Yang, Zheng, & Zaheer, 2015). To further limit potential confounding influences, I dropped observations where two alliance announcements for the same firm had overlapping test periods, where the firm reported earnings during the test period, or where significant exogenous market shocks occurred during the test period. Two significant exogenous shocks were identified: the 2001 dotcom crash (17th Sept 2001), and the 2008 subprime crash (29th Sept 2008).

The normal returns were estimated using a market model (Fama, 1976). A market model is preferable because, in contrast to a market-adjusted return or a mean-adjusted return, it accounts for both risk and market movement. The market model is derived from a simple linear regression for the estimation period where RI (return for firm 1 on a given day) is the dependent variable and RM (return for the market on a given day) is the independent variable. For a global sample, the most suitable market returns are daily returns from the value-weighted S&P 1200 Global. (From 1995-2010, I found a correlation of 0.81 between the S&P Global 1200 and the S&P 500.)

To calculate the abnormal return for each t in the test period where RI_t denotes the return for firm 1 on day t and RM_t denotes the return for the market on day t :

Equation 6.1: Event study abnormal return = $R_{1t} - (\alpha + \beta_1 * RM_t)$

6.4.2 Market commonality

Market commonality is a firm level-measure that considers the proportion of the firm's markets in which it encounters a given competitor (e.g., Baum & Korn, 1999; Chen, 1996). To maximize the objectivity of the measure and afford similar emphasis to equivalent business overlaps, markets were defined at the 4-digit Standard Industry Classification (SIC) code level. Each additional SIC digit offers additional insight regarding a business area where a firm is active. For instance, SIC code '3' refers to manufacturing, '36' to electronics, '367' to computers, and '3674' to semiconductors. Self-reported 4-digit SIC codes, available through Compustat, are a widely utilized tool for setting market boundaries (e.g., Oxley et al., 2009; Wang & Zajac, 2007; Young et al., 2000).

Where I_j is an indicator variable that takes a value of '1' if partner j is active in the firm's market m and '0' otherwise;

Equation 6.2: Market commonality = $\frac{\sum_{m=1}^n I_j m}{\sum_{m=1}^n m}$

6.4.3 Opportunism

Firm opportunism is measured as the inverse of future cooperation between the firm and the partner. Future cooperation reflects the partner's willingness to work with the firm again, where the partner must allow its fate to again be determined by the firm's behavior (Gulati, 1995b; Zaheer & Harris, 2006). A partner will not allow its fate to be determined by a firm it knows to be opportunistic (Bradach & Eccles, 1989). The partner's decisions

to cooperate with the firm again in the future are driven their experience in the focal alliance because the firm's current behavior represents the best information that the partner has regarding the firm's future opportunistic tendencies (Gulati, 1995a). Therefore, where a partner has experienced opportunism in the focal alliance, future cooperation will be less (Hill, 1990). Firm opportunism reduces future cooperative opportunities with a partner "by either eliciting a response in kind or by necessitating that actors bear monitoring and bonding costs during future exchanges" (Hill, 1990: 507). Opportunism fuels a "lack of trust and hostility" towards the firm that manifests in reduced future cooperation between the firm and the partner (Hill, 1990: 508-510).

Future cooperation was measured by the cumulative duration of all alliances, in completed months, between the firm and its partner during the four years after the alliance announcement date (Pangarkar, 2003; Rahman & Korn, 2014). This is a more fine-grained measurement approach than a count-based approach to the number of alliances (Rothaermel & Deeds, 2006), which required extensive search and analysis. First, to identify all other alliances between the firm and its partner in the period of interest, I searched SDC, LexisNexis, Factiva, and SEC filings. Second, I searched for termination/dissolution dates for all these alliances, including the focal alliance. This information is rarely provided by SDC, so extensive searching of SEC filings, LexisNexis, and Factiva were necessary. To supplement or confirm this data where possible, I made direct contact with the firm officer listed on the original alliance announcement.

For most alliances, termination/dissolution could not be satisfactorily determined. Therefore, I sought evidence that alliances were still operational more than four years following the announcement of the focal alliance (i.e., at some point beyond the window

of interest). This approach was far more effective and there were several cases where an alliance would re-appear in a firm's 10-K report after not being mentioned for several years. In those cases where it was not possible to identify either (1) the termination/dissolution of the alliance or (2) its survival for more than four years after the announcement date of the focal alliance, I followed Ahuja's (2000) assumption that alliances were operational for six months after alliance activity was last documented, or eighteen months after alliance announcement – whichever was later: "The assumption of a short life cycle for such agreements... is consistent with the very specific and short term nature of their objectives in most cases" (Ahuja, 2000: 326). The measure for opportunism was derived as the inverse of the score for future cooperation between the firm and its partner.

6.4.4 Market rivalry

The first moderating variable, market rivalry, refers to the frequency and aggression of rivalrous actions and reactions between firms in common markets in a market (Baum & Korn, 1999; Jayachandran et al., 1999; Prince & Simon, 2009). It is measured by the level of firm turnover in common markets (Barnett, 1993; Boeker et al., 1997; Haveman & Nonnemaker, 2000). Market rivalry is popularly operationalized by price and performance measures (Gimeno & Woo, 1996a:1999; Jans & Rosenbaum, 1997; Parker & Röller, 1997), but these are outcomes of rivalry. Firm turnover chosen because it represents a more direct measure of the rivalry process (Baum & Korn, 1999).

Turnover is established through a count of entries and exits by U.S. public firms in the 4-digit SIC codes that the firm shares with its partner. An entry (exit) was defined to occur

in the first year that the firm (no longer) reports a presence in that product area (Baum & Korn, 1999). This ‘churn’ of firms in a market will be high where market rivalry is high and low when it is low (Barnett, 1993; Boeker et al., 1997; Haveman & Nonnemaker, 2000). The total number of entries and exits in common markets was divided by the number of common markets, (e.g., Baum & Korn, 1996:1999), thereby offering an average level of market rivalry across all the markets that were common between the firm and the partner.

6.4.5 *Repeated cooperation*

The second moderator, repeated cooperation, refers to the firm’s history of past cooperative agreements with the partner (Villalonga & McGahan, 2005; Wang & Zajac, 2007; Zollo et al., 2002). It is measured by a count of the number of agreements that the firm entered with the partner in the four years preceding announcement of the focal agreement (Argyres et al., 2007; Carson et al., 2006; Lumineau & Quélin, 2012; Villalonga & McGahan, 2005; Wang & Zajac, 2007; Zollo et al., 2002).

6.5 Controls

Acknowledging idiosyncrasies that may influence opportunism or value creation across multiple levels, I attempted to monitor their effect on the focal relationships by employing control variables (Whetten, 2009). Control variables refer to other recognized predictors of opportunism and value creation that are not part of the conceptual model.

I controlled for firm size ($\ln(\text{total assets})$) and age ($\ln(\text{age})$) because firms with smaller resource sets (Young et al., 2000) or mature firms (Yu & Cannella, 2013) may be less

inclined toward aggression. To measure total assets, financial data for all non-U.S. firms was converted to constant U.S. dollars at 1995 rates (January 1st; Ahuja, 2000). I also included total alliances over the preceding four years for both the firm and the partner (Gnyawali et al., 2006) as well as the presence of equity governance (Ryu & Reuer, 2016). I controlled for three types of competitive similarity – size similarity, age similarity, and strategic similarity (Gimeno & Woo, 1996a). Where i and j are partners in the focal alliance and k and l are the two firms with the maximum size difference in my sample:

Equation 6.3: Size similarity = $1 - \frac{|TotAssets\ i - TotAssets\ j|}{\max_{k,l} |TotAssets\ k - TotAssets\ l|}$

Where i and j are partners in the focal alliance and k and l are the two firms with the maximum age difference in my sample:

Equation 6.4: Age similarity = $1 - \frac{|age\ i - age\ j|}{\max_{k,l} |age\ k - age\ l|}$

Strategic similarity was measured as a binary variable that assumes a value of “1” if two firms were the same type of semiconductor firm and “0” otherwise. There were six types of firms in my sample (1) integrated device manufacturers – firms that design, develop, and manufacture chips; (2) fabless firms – firms that design chips but do not manufacture; (3) foundries – firms that manufacture chips designed by other firms; (4) packaging and testing providers; (5) equipment providers, and (6) firms not active in the semiconductor industry (Park et al., 2014b). According to a pre-specified protocol of firm type definitions, I analyzed data from SEC filings, Lexis Nexis, and Factiva to identify firm types for all observations. Prior to analysis of the full sample, a subsample of 30 firm types were independently classified by both myself and a second coder with 10+ years’

experience in electronics. The initial correlation between our classifications was 0.93 with consensus achieved on the remaining observations following discussion. The protocol was then updated accordingly. I also included measures for the partner’s market commonality, partner’s size (ln(total assets)), and the level of similarity between the firm and the partner’s market commonality. Lastly, market importance was a binary measure of whether the firm met the partner in its most important market (i.e., primary 4-digit SIC code) (e.g., Gimeno, 1999). This was subsequently employed as an instrument to test for endogenous bias. All variables, including controls, are summarized in Table 6.2.

Table 6.2: Empirical variables

Empirical Variable	Description
Value Creation <i>(Dependent variable)</i>	The residuals from a market model estimate of each firm’s stock prices for a two-day test period (t-1 to t) surrounding the alliance announcement. Data on three-day (t-1 to t+1), and seven-day (t-3 to t+3) test periods were also analyzed.
Market Commonality <i>(Independent variable)</i>	The proportion of the firm’s markets in which it encounters a given competitor. I_j is an indicator variable that takes a value of ‘1’ if partner j is active in the firm’s market m and ‘0’ otherwise: $\text{Market Commonality} = \frac{\sum_{m=1}^n I_{jm}}{\sum_{m=1}^n m}$ Markets were defined at 4-digit SIC code level.
Opportunism <i>(Mediating variable)</i>	The inverse of future cooperation. Future cooperation is the cumulative duration, in completed months, of all agreements between the firm and its partner in the four years following the date of the focal alliance announcement.
Market Rivalry <i>(Moderator)</i>	The mean number of entries and exits in common 4-digit SIC codes by U.S. public firms in the observation year.

Repeated Cooperation (Moderator)	A count-based measure of the number of past cooperative agreements between the firm and the partner in the four years preceding the alliance announcement date.
<i>Controls</i>	
Firm Size	Natural log of total assets in USD (converted at 1/1/1995 rates as necessary).
Firm Age	Logged value of the completed years between when each firm was first incorporated and the beginning of the observation year.
Firm Total Alliances	Total number of dyadic alliances for each firm in the four years preceding the announcement of the focal alliance.
Equity Governance	A categorical measure of the alliance governance structure ('0' = non-equity; '1' = equity).
Strategic Similarity	Binary variable that assumes a value of "1" if the firm and its partner are the same 'type' of semiconductor firm and "0" otherwise.
Size Similarity	$1 - \frac{ TotAssets\ i - TotAssets\ j }{\max_{k,l} TotAssets\ k - TotAssets\ l }$ <p>where <i>i</i> and <i>j</i> are partners in the focal alliance and <i>k</i> and <i>l</i> are the two firms with the maximum size difference in the sample.</p>
Age Similarity	$1 - \frac{ age\ i - age\ j }{\max_{k,l} age\ k - age\ l }$ <p>where <i>i</i> and <i>j</i> are partners in the focal alliance and <i>k</i> and <i>l</i> are the two firms with the maximum age difference in the sample.</p>
Partner's Market Commonality	As per Market Commonality from the partner's perspective.
Partner's Total Alliances	As per Firm Total Alliances from the partner's perspective.
Similarity of Market Commonality	$1 - \frac{ Market\ Commonality\ i - Market\ Commonality\ j }{\max_{k,l} Market\ Commonality\ k - Market\ Commonality\ l }$

	where i and j are partners in the focal alliance and k and l are the two firms with the maximum market commonality difference in my sample.
Market Importance <i>(Instrument)</i>	Binary variable that assumes a value of “1” if the firm overlaps with the partner in its primary 4-digit SIC code and “0” otherwise.

6.6 Pilot study

Before undertaking full-study data collection and analysis, a pilot study was carried out with a sample of 30 dyadic R&D agreements from 1995. This helped me to isolate any procedural issues with the research design, identify any issues in the data collection and capture process, and test the analysis process (Saunders et al., 2009). The pilot study led to several improvements in my research design:

- It rapidly became apparent during the pilot study that the alliance announcement dates provided by SDC were often inaccurate. Therefore, a protocol was developed for identifying accurate alliance announcement dates. I ensured that all dates were cross-validated by at least two independent sources (e.g., Anand & Khanna, 2000; Lavie, 2007). (The steps I took to verify the alliance announcement dates are laid out in Section 6.3.)
- This phase motivated me to shorten the test period for the event study. For the pilot study, I employed a longer test period (Anand & Khanna, 2000) but the results suggested that abnormal returns could be observed within a much narrower time window (Amicia et al., 2013; Oxley et al, 2009).

- While the sample was too small to provide meaningful results, it allowed me to evaluate issues with the data analysis process. Specifically, the pilot study helped me to refine an Excel workbook capable of generating the firm-level event study estimates and deriving the cross-sectional outputs. This approach was quite onerous, but it allowed me to monitor the estimation procedure more closely and customize certain aspects to suit specific needs of this research.

- It also led me to amend the measure and definitions associated with market commonality. For the pilot study, I attempted a far more fine-grained measure for market commonality, incorporating both SIC codes and product segment overlaps. However, it became clear that it was highly impractical to segment all the markets in which overlaps occurred and not doing so would bias the measure, so I moved to the more balanced approach of defining markets at the four-digit SIC code level (e.g., Oxley et al., 2009; Wang & Zajac, 2007; Young et al., 2000).

6.7 Chapter summary

In this chapter I have outlined the research method. I began by explaining how the dynamic and innovative nature of the global semiconductor industry leads to intensive inter-firm competition and cooperation, which makes it a highly suitable empirical context. I next outlined the data sources and explained the decisions made during the data collection process, which led to a final sample of 464 firm-level observations. I proceeded to explain how the core constructs are measured: *Value Creation*, *Market Commonality*, *Opportunism*, *Market Rivalry*, and *Repeated Cooperation*. The chapter concluded by outlining relevant control variables, explaining why they are necessary to account for

idiosyncratic influences on opportunism and value creation, and discussing improvements arising from the pilot study.

Chapter 7: Results

7.1 Chapter introduction

In previous chapters, the conceptual model for my research has been developed and the decisions behind my research methodology and method have been explained. These have generated two empirical models, a *Value Creation* model and an *Opportunism* model. This chapter sets out the process of testing these models.

I begin by reporting descriptive statistics and pairwise correlations (Section 7.2), before discussing the results of the event study method to measure value creation (Section 7.3). I proceed to evaluate the five hypotheses proposed. Beginning with the *Value Creation* model, I find insufficient evidence to support Hypothesis 1 and Hypothesis 2b (Section 7.4). Moving to the *Opportunism* model, I find evidence to support Hypothesis 2a, Hypothesis 3, and Hypothesis 4 (Section 7.5). This upholds that market commonality is related in a curvilinear U-shape to opportunism, but the association is made weaker by market rivalry and repeated cooperation. Through a variety of postestimation procedures, I find that these results are resistant to endogenous and exogenous biases (Section 7.6).

7.2 Descriptive statistics and pairwise correlations

Table 7.1 reports mean, standard deviation, minimum, and maximum values for all variables in the analysis. Pairwise correlations are also reported. The independent variable, market commonality, was mean centered at zero to (somewhat) reduce collinearity with its quadratic term (Dawson, 2014).

Table 7.1: Descriptive statistics and pairwise correlations

		Mean	S.D.	Min	Max	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1)	Market Commonality	-0.0052	0.2463	-0.3186	0.6528	1																			
(2)	Opportunism	0.3831	0.2243	0.0840	2.5000	-.01	1																		
(3)	Value Creation (2-Day CAR)	0.0088	0.0955	-0.1408	1.7335	.07	.03	1																	
(4)	Market Rivalry	1.4059	1.3496	0	6.0000	.04	-.08	-.01	1																
(5)	Repeated Cooperation	0.3254	0.9815	0	6.0000	.05	-.17	-.05	.03	1															
(6)	Market Importance	0.4761	0.5000	0	1	.47	.02	-.01	-.03	-.00	1														
(7)	Firm Size ^a	1.1043	0.6657	0.0023	2.1783	-.48	-.20	-.14	-.04	.17	-.28	1													
(8)	Firm Age ^a	1.6344	0.4092	0	2.3201	-.42	-.04	-.12	-.10	.04	-.19	.57	1												
(9)	Firm Total Alliances	41.2967	51.8066	0	291	-.25	-.25	-.07	.09	.38	-.23	.53	.29	1											
(10)	Equity Governance	0.1507	0.3582	0	1	-.05	-.01	-.03	-.00	-.09	-.04	.06	.12	-.08	1										
(11)	Strategic Similarity	0.4115	0.4927	0	1	.06	-.09	-.04	.02	.08	.03	.23	.11	.07	.00	1									
(12)	Size Similarity	0.9650	0.0370	0.8292	1	-.11	.21	.01	.05	-.13	-.06	-.15	-.02	-.11	.01	-.26	1								
(13)	Age Similarity	0.7742	0.1793	0	1	.09	.08	-.02	-.06	.03	.15	-.02	.16	-.03	-.08	.18	-.07	1							
(14)	Partner's Market Commonality	0.3522	0.2512	0.0286	1	-.02	-.03	-.03	.02	.03	.02	.08	.12	.08	-.04	.06	.41	.00	1						
(15)	Similarity of Market Commonality	0.7367	0.2580	0	1	-.35	.06	-.01	-.03	.10	-.17	.13	.07	.08	-.01	.04	-.12	.19	-.43	1					
(16)	Partner's Total Alliances	42.6220	53.6109	0	291	.08	-.23	-.01	.13	.37	-.06	.08	-.06	.19	-.10	.04	-.46	.03	-.27	.11	1				
(17)	Opportunism (3-Year Window)	0.4123	0.2108	0.1099	2.5	-.02	.98	.02	-.08	-.17	.02	-.18	-.03	-.25	.01	-.10	.19	.10	-.05	.07	-.21	1			
(18)	Opportunism (5-Year Window)	0.3652	0.2333	0.0699	2.5	-.00	.99	.03	-.07	-.18	.02	-.22	-.05	-.26	-.02	-.10	.22	.06	-.02	.05	-.24	.95	1		
(19)	Value Creation (3-Day CAR)	0.0130	0.1410	-0.2150	2.6416	.04	.04	.97	-.02	-.04	-.03	-.14	-.10	-.07	-.05	-.05	.02	-.01	-.04	.01	-.02	.03	.04	1	
(20)	Value Creation (7-Day CAR)	0.0102	0.1379	-0.3257	2.0672	.04	.04	.81	.01	-.05	-.07	-.15	-.10	-.06	-.05	-.06	.04	-.02	-.05	.01	-.01	.04	.04	.87	1

n=427 (casewise deletion)
Coefficients greater than .098 are significant at p<0.05.
α = natural log.

Some of the variables are purely of statistical relevance (i.e., they do not relate to any meaningful value) but others are worth noting. Two-day abnormal stock returns arising from the announcement of cooperation agreements range from negative returns of -14.1% to positive returns of 173%. The mean level of entries and exits in common markets per calendar year is 1.41. The mean number of historic cooperative agreements between the firm and the partner in the four years preceding the focal agreement was 0.33 with a minimum of 0 and a maximum of 6. On average, firms had a total of 41.3 cooperative agreements over the same period with a minimum of zero and a maximum of 291. 47.6% of firms overlapped with the partner in their primary 4-digit SIC code and 41% of firms were the same firm type as the partner.

7.3 Event study results

To establish an initial value creation effect for sampled alliances and compare it to value creation reported in other samples, cross-sectional abnormal returns for each test day were calculated. Where $\hat{\epsilon}_{i_t}$ is the abnormal return for a given event on event day t , Equation 7.1 specifies daily abnormal returns (\overline{AR}) for z events.

Equation 7.1: Daily abnormal returns: $\overline{AR} = \frac{1}{z} \sum_{i=1}^z \hat{\epsilon}_{i_t}$

For each test day, cross-sectional abnormal returns are laid out in Table 7.2.

Table 7.2: Cross-sectional abnormal returns

TEST DAY	\overline{AR}
-3	0.001684
-2	0.001746
-1	0.001827
0	0.007458
1	0.002689
2	-0.001149
3	-0.001780

As outlined in Chapter 6, I examined abnormal returns across two-day (t-1 to t), three-day (t-1 to t+1), and seven-day (t-3 to t+3) test periods. Referred to as cumulative abnormal returns (CARs), these are calculated by aggregating the abnormal returns for each day in the relevant test period (Equation 7.2-7.4).

Equation 7.2: Value Creation (2-Day CAR) = $\hat{\epsilon}i_{t-1 to t}$

Equation 7.3: Value Creation (3-Day CAR) = $\hat{\epsilon}i_{t-1 to t+1}$

Equation 7.4: Value Creation (7-Day CAR) = $\hat{\epsilon}i_{t-3 to t+3}$

The initial value creation effect and the basis for comparison with other research are made possible through cross sectional cumulative abnormal returns (\overline{CAR}). Cross-sectional CARs represent the average CAR in the sample, which is equivalent to aggregating the relevant daily cross-sectional abnormal returns (\overline{AR}) in Table 7.2.

Equation 7.5: Cross-sectional abnormal returns: $\overline{CAR} = \sum \overline{AR}$ for each day in the relevant test period.

Cross sectional cumulative abnormal returns (CARs) are outlined in Table 7.3. As the variance of the test period is subject to additional volatility induced by the alliance announcement (Brown & Warner, 1985), time series standard errors are derived from the estimation period (Campbell, Lo, & McInlay, 1997). This process is explained in Appendix II.

Table 7.3: Cross-sectional cumulative abnormal returns

	\overline{CAR}	Time Series SE
Value Creation (2-Day CAR)	0.009299***	0.001830
Value Creation (3-Day CAR)	0.012012***	0.002241
Value Creation (7-Day CAR)	0.012514***	0.003423
*** $p < 0.001$		

I find that firms in the sample experience positive and significant value creation across the three test periods estimated ($p < 0.001$). Previous research has reported abnormal returns ranging from 0.01% (Das & Sengupta, 1998) to 1.78% (Anand & Khanna, 2000). Value creation in my sample is between these extremes. Cross sectional CARs were 0.9%, 1.2% and 1.3% for the two-day, three-day, and seven-day test periods respectively. Similar levels of cross-sectional value creation are reported by Kale and colleagues (2002), Oxley and colleagues (2009), and Reuer and Koza (2000), among others.

For each firm in the sample, their 2-Day CAR (t-1 to t) is employed to measure value creation. The two-day test period is chosen because it augments my previous efforts to limit confounding influences.

The next section discusses the outcomes of hypothesis testing using ordinary least squares (OLS) regression analysis to analyze the sample and measures I have outlined. The five hypotheses from Chapter 4 are laid out in Table 7.4. I begin by addressing the model where *Value Creation* is the dependent variable to evaluate Hypothesis 1 and Hypothesis 2b, before proceeding to the *Opportunism* model for Hypothesis 2a, Hypothesis 3, and Hypothesis 4.

Table 7.4: Conceptual model

Hypotheses
<i>Hypothesis 1. In coopetition, market commonality is curvilinearly related (taking an inverted U-shape) to firm value creation. Low and moderate levels of market commonality are positively associated with value creation and high market commonality is negatively associated with value creation.</i>
<i>Hypothesis 2a. In coopetition, market commonality is curvilinearly related (taking a U-shape) to opportunism. Low and moderate levels of market commonality are negatively associated with opportunism and high market commonality is positively associated with opportunism.</i>
<i>Hypothesis 2b. Opportunism is negatively associated with value creation.</i>
<i>Hypothesis 3. In coopetition, the relationship between market commonality and opportunism is negatively moderated by market rivalry. Market commonality has a weaker association with opportunism, both positive and negative, when market rivalry is high.</i>
<i>Hypothesis 4. In coopetition, the relationship between market commonality and opportunism is negatively moderated by repeated cooperation. Market commonality has a weaker association with opportunism, both positive and negative, when repeated cooperation is high.</i>

7.4 Value Creation

The process of operationalizing the conceptual model led to the following empirical model for value creation:

Equation 7.6:
$$\text{Value Creation} = \beta_1 + \beta_2 \text{Market Commonality} + \beta_3 \text{Market Commonality}^2 + \beta_4 \text{Opportunism} + \beta_5 \text{Market Rivalry} + \beta_6 \text{Repeated Cooperation} + \beta_7 \text{Firm Size} + \beta_8 \text{Firm Age} + \beta_9 \text{Firm Total Alliances} + \beta_{10} \text{Equity Alliance} + \beta_{11} \text{Strategic Similarity} + \beta_{12} \text{Size Similarity} + \beta_{13} \text{Age Similarity} + \beta_{14} \text{Partner's Market Commonality} + \beta_{15} \text{Partner's Total Alliances} + \beta_{16} \text{Similarity of Market Commonality} + \beta_{17} \text{Market Importance} + \varepsilon$$

In social and behavioral research, the relatively blunt measurement instruments available mean that a quadratic term is most suitable to model curvilinear effects (e.g., Baum & Korn, 1999; Fuentelsaz & Gómez, 2006). This contrasts with the natural sciences where more precise data may be available and more sophisticated transformations are appropriate. A natural logarithmic transformation, for example, compresses higher value to estimate a curvilinear effect that is similar to a quadratic term but does not change direction; while a cubic transformation specifies an S-shaped relationship, where the direction of the relationship is expected to change twice. A quadratic term can test for a variety of effect types in social research, including U-shapes and inverted U-shapes, as well as relationships where the effect of the predictor is stronger or weaker at higher or lower values.

Based on the conceptual development, Equation 7.6 specifies the anticipated predictors of *Value Creation*. This includes the independent variable, *Market Commonality*, and the

quadratic transformation necessary to evaluate the proposed curvilinear effect, as well as the mediating variable, *Opportunism*, and relevant controls.

It is noteworthy that, in the case of both empirical models, the mathematical transformations cause structural multicollinearity in the data. This is explained in more detail in Appendix III. As collinearities are contained within sets of variables intended for joint interpretation, it does not create difficulties for evaluating the hypotheses.

7.4.1 Hypothesis 1 and Hypothesis 2b

Table 7.5 reports OLS estimates for the *Value Creation* model. This model estimates the relationships between market commonality and value creation (Hypothesis 1), and opportunism and value creation (Hypothesis 2b). Two sets of estimates are presented: columns 1-4 where homoscedasticity was assumed, and columns 5-8 where robust standard errors (White, 1980) were estimated to correct for heteroskedasticity (Breusch-Pagan: $chi-sq = 453.23$; $p < 0.001$). Heteroskedasticity refers to correlations between the predictors and the variance of the residuals, which violates the Gauss-Markov assumption of homoskedasticity (zero correlations between the predictors and the residuals). Where homoskedasticity is violated, the OLS estimators remain unbiased but the estimate is no longer efficient as the variance, and thus the standard errors, are biased. I correct for this bias by employing robust standard error estimates (Column 8) for hypothesis testing.

To evaluate the linear and nonlinear associations between market commonality and value creation, as well as the potential intermediary (mediating) influence of opportunism, estimation proceeded in four steps. First, Column 5(1) estimates the model with only relevant controls. As suggested in Chapter 6, I tested a broader suite of potential controls

than those reported. When control variables did not generate improved model fit, a more parsimonious model was preferred. Column 6(2) examines a linear relationship between market commonality and value creation by introducing the market commonality variable. Column 7(3) introduces the quadratic term necessary to test the curvilinear main effect outlined in Hypothesis 1. Column 8(4) introduces the opportunism variable to test the mediating effect (Hypothesis 2b). While these steps are illuminating because they illustrate changes in model fit as variables are introduced, I rely on estimates from the fully specified model (Column 8) for hypothesis testing.

Table 7.5: OLS regression results for Value Creation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
					Robust	Robust	Robust	Robust
Constant	.032*** (.009)	.032*** (.010)	.032** (.010)	.032* (.014)	.032* (.016)	.032 (.019)	.032 (.020)	.032 (.017)
Firm Size ^a	-.021** (.007)	-.021** (.008)	-.021** (.008)	-.021** (.008)	-.021 (.011)	-.021 (.014)	-.021 (.014)	-.021 (.013)
H1: Commonality	Market	-.001 (.021)	-.005 (.049)	-.005 (.050)		-.001 (.056)	-.005 (.173)	-.005 (.189)
H1: Market Commonality ²			.007 (.096)	.008 (.097)			.007 (.060)	.008 (.062)
H2b: Opportunism				-.001 (.021)				-.001 (.011)
R-squared	.021 p=.002	.021 p=.001	.021 p=.027	.021 p=.056	.021 p=.053	.021 p=.025	.021 p=.058	.021 p=.010
n=431 Control variables not resulting in improved fit are omitted. Two-tailed tests; one-tailed when hypothesized. * p<0.05 ** p<0.01 *** p<0.001								

Hypothesis 1 posited that market commonality is associated with value creation in an inverted-U shape, where it initially increases value creation but this effect reverses as

market commonality rises. In Column 7, the negative market commonality coefficient ($p>0.05$) and the positive quadratic term ($p>0.05$) are directionally opposed to the hypothesized relationship and neither are significant. Thus, there is insufficient evidence to support Hypothesis 1.

The causal steps approach to mediation analysis (Baron & Kenny, 1986) requires that the effect of market commonality on value creation becomes weaker or insignificant (“partial mediation” or “full mediation”) when the opportunism variable is included. At the same time, the opportunism variable itself is expected to become a significant predictor. Under the causal steps approach, the outcome of Hypothesis 1 alone would be considered insufficient to reject the null because the overall relationship is not significant.

Nonetheless, the individual dimensions (i.e., Hypothesis 2a and 2b) of the overall effect can support mediation through a total indirect effect (Hayes, 2013). Hypothesis 2b predicted a negative effect of opportunism on value creation where, as opportunism rises, value creation is reduced. In Column 8, however, the opportunism coefficient is negative and non-significant ($p>0.05$), which does not support Hypothesis 2b. Holding market commonality constant, opportunism is not a significant predictor of value creation in alliances. In certain cases, it may be that quantifying the total indirect effect can still offer support for mediation (Hayes, 2013) but in this case the negative estimate for the market commonality coefficient is conclusive.

Thus, analysis of the data offers no evidence to suggest that market commonality or opportunism influence value creation. It is noteworthy that the Wald statistic for the overall Value Creation model is not significant with an extremely low reported R-squared.

This suggests that the variables in the model are not particularly useful predictors of value creation. I will now return to the *Opportunism* model to evaluate Hypothesis 2a, Hypothesis 3, and Hypothesis 4.

7.5 *Opportunism*

The hypothesized effects on opportunism produce the empirical model specified in Equation 7.7. This includes the independent variable *Market Commonality* and the quadratic transformation necessary to evaluate the proposed curvilinear effect. It also incorporates the necessary transformations to evaluate both moderators, *Market Rivalry* and *Repeated Cooperation*, and relevant control variables.

Equation 7.7:
$$\begin{aligned} \text{Opportunism} = & \beta_1 + \beta_2 \text{Market Commonality} + \beta_3 \text{Market} \\ & \text{Commonality}^2 + \beta_4 \text{Market Commonality} * \text{Market Rivalry} + \beta_5 \text{Market} \\ & \text{Commonality}^2 * \text{Market Rivalry} + \beta_6 \text{Market Commonality} * \text{Repeated Cooperation} + \\ & \beta_7 \text{Market Commonality}^2 * \text{Repeated Cooperation} + \beta_8 \text{Repeated Cooperation} + \beta_9 \text{Market} \\ & \text{Rivalry} + \beta_{10} \text{Repeated Cooperation} + \beta_{11} \text{Firm Size} + \beta_{12} \text{Firm Age} + \beta_{13} \text{Firm Total} \\ & \text{Alliances} + \beta_{14} \text{Equity Alliance} + \beta_{15} \text{Strategic Similarity} + \beta_{16} \text{Size Similarity} + \beta_{17} \text{Age} \\ & \text{Similarity} + \beta_{18} \text{Partner's Market Commonality} + \beta_{19} \text{Partner's Total Alliances} + \\ & \beta_{20} \text{Similarity of Market Commonality} + \beta_{21} \text{Market Importance} + \varepsilon \end{aligned}$$

7.5.1 *Hypothesis 2a*

Table 7.6 reports OLS estimates for the analysis of the effect of market commonality on opportunism. I present three sets of estimates; columns 1-4, which assumed homoscedasticity, columns 5-8 where robust standard errors are estimated to correct for

heteroskedasticity in the model (Breusch-Pagan: $chi-sq = 66.68$; $p < 0.001$), and columns 9-12 where clustered robust standard errors (e.g., Cameron & Miller, 2015) are estimated to address positive autocorrelation at the level of the dyad (Durbin-Watson: $d = 1.02$). Autocorrelation refers to correlation among the residuals of observations that are assumed to be independent. This violates the Gauss-Markov assumption of random drawings. Standard errors are biased depending on the nature of the correlation: (positive correlation deflates standard errors; negative correlation inflates standard errors). Having derived Durbin Watson statistics and identified autocorrelation at the dyad level, the appropriate correction is to cluster the observations before estimating robust standard errors (Cameron & Miller, 2015).

In Table 7.6, Column 9(1, 5) presents a basic model with just relevant control variables. Column 10(2, 6) illuminates a linear relationship between market commonality and opportunism through the introduction of the market commonality variable. Column 11(3, 7) introduces the quadratic term necessary to test the curvilinear effect outlined in Hypothesis 2a. Column 12(4, 8) introduces the interaction terms necessary to test Hypothesis 3-4. To address both the heteroskedasticity and autocorrelation in the model, the hypotheses are evaluated with clustered robust standard errors (columns 9-12).

The Wald statistic for the basic model (column 9) is significant ($p < .001$), indicating the relevance of the control variables to the model. Hypothesis 2a posited a nonlinear effect of market commonality on opportunism, whereby market commonality initially has a negative effect on opportunism but this effect is reversed at higher levels of market commonality. The coefficient for market commonality in Column 12 is negative and significant ($p < 0.05$) while the coefficient for the quadratic term is positive and significant

($p < 0.05$). This supports Hypothesis 2a, that low and moderate levels of market commonality reduce opportunism but this is reversed at higher values of market commonality where there is a positive effect on opportunism. Figure 7.1 illustrates the curvilinear trajectory of the relationship.

7.5.2 Hypothesis 3

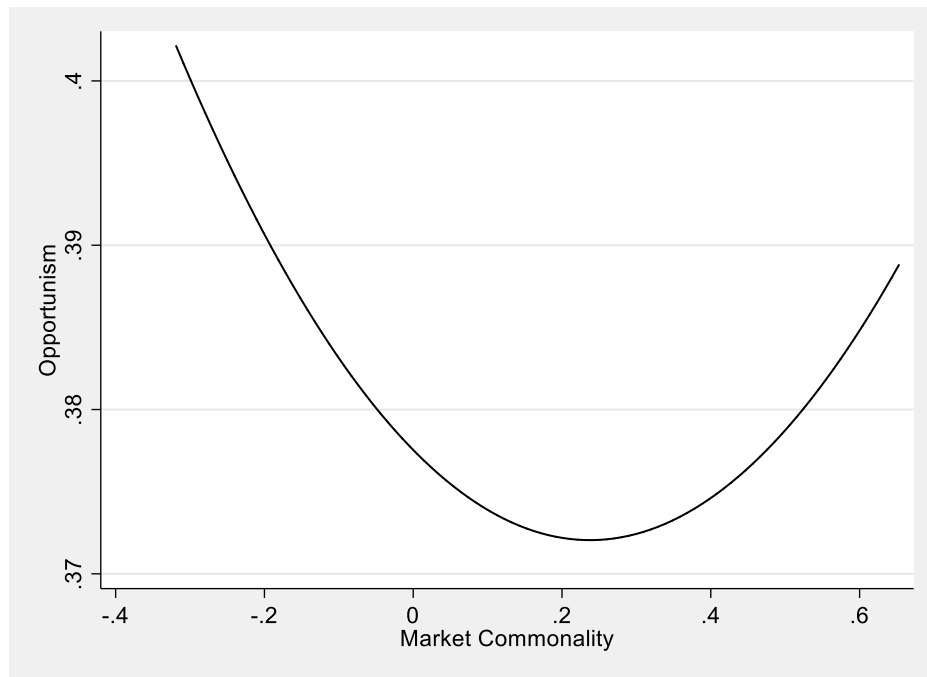
To detect the moderating effect of market rivalry on the nonlinear relationship between market commonality and opportunism, I derived interaction terms with both the linear and the quadratic terms for market commonality (Dawson, 2014). Both coefficients were then jointly tested to assess improved model fit when the interaction is included (i.e., $H_0: \beta_4 \text{ Market Commonality} * \text{Market Rivalry} = 0, \beta_5 \text{ Market Commonality}^2 * \text{Market Rivalry} = 0$).

Hypothesis 3 predicted that the association between market commonality and opportunism will be weaker when market rivalry is high. In Column 12, the interaction terms for market rivalry are both negatively related to the main effect. The coefficient for *Market Commonality * Market Rivalry* is positive, suggesting that the negative effect of market commonality on opportunism is less where market rivalry is high. The coefficient for *Market Commonality² * Market Rivalry* is negative, suggesting that the positive effect of higher values of market commonality on opportunism is less where market rivalry is high. A Wald Statistic to evaluate the joint significance of the coefficients confirms support for Hypothesis 3 ($F = 4.57, p < 0.05$).

Table 7.6: OLS regression results for Opportunism

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
					Robust	Robust	Robust	Robust	Clustered	Clustered	Clustered	Clustered
Constant	-286 (.294)	-201 (.300)	-179 (.301)	-142 (.303)	-286 (.283)	-201 (.281)	-179 (.279)	-142 (.280)	-286 (.280)	-201 (.257)	-180 (.252)	-142 (.250)
Market Rivalry	-002 (.007)	-002 (.007)	-001 (.007)	.002 (.008)	-002 (.007)	-002 (.007)	-002 (.007)	.002 (.007)	-002 (.009)	-002 (.009)	-001 (.009)	.002 (.009)
Firm Size ^a	-.037* (.018)	-.049* (.019)	-.051** (.019)	-.048* (.019)	-.037* (.015)	-.049** (.017)	-.050** (.017)	-.048** (.017)	-.037** (.013)	-.049*** (.013)	-.050*** (.014)	-.048*** (.014)
Firm Total Alliances	-.001* (.000)	-.001* (.000)	-.001* (.000)	-.001* (.000)	-.001** (.000)	-.001** (.000)	-.001** (.000)	-.001** (.000)	-.001** (.000)	-.001** (.000)	-.001** (.000)	-.001** (.000)
Repeated Cooperation	-.011 (.011)	-.008 (.012)	-.007 (.012)	-.008 (.012)	-.011* (.005)	-.008 (.006)	-.007 (.006)	-.008 (.006)	-.011 (.008)	-.008 (.008)	-.007 (.008)	-.007 (.007)
Size Similarity	.676* (.302)	.615* (.304)	.576 (.307)	.540 (.310)	.676* (.291)	.615* (.287)	.576* (.285)	.540 (.286)	.676* (.293)	.615* (.274)	.576* (.265)	.540* (.264)
Age Similarity	.096 (.053)	.109 (.053)	.106* (.054)	.108* (.054)	.096* (.039)	.109** (.040)	.107** (.040)	.108** (.040)	.096 (.055)	.109 (.056)	.106 (.055)	.108 (.056)
Similarity of Market Commonality	.076 (.044)	.047 (.048)	.062 (.050)	.051 (.051)	.076* (.034)	.047 (.034)	.062 (.037)	.051 (.037)	.076 (.046)	.047 (.048)	.062 (.051)	.051 (.050)
Partner's Total Alliances	-.001** (.000)	-.001** (.000)	-.001** (.000)	-.001** (.000)	-.001*** (.000)	-.001*** (.000)	-.001*** (.000)	-.001*** (.000)	-.001*** (.000)	-.001*** (.000)	-.001*** (.000)	-.001*** (.000)
H2a: Market Commonality		-.074 (.050)	-.168 (.111)	-.251 (.160)		-.074* (.040)	-.168 (.106)	-.251* (.137)		-.074 (.049)	-.168 (.124)	-.251* (.147)
H2a: Market Commonality²			.209 (.221)	.473 (.312)			.209 (.185)	.473* (.240)		.209 (.211)	.473* (.255)	
H3: Market Commonality*Market Rivalry				0.43 (.074)				0.43 (.062)				0.43 (.060)
H3: Market Commonality²*Market Rivalry				-.165 (.155)				-.165 (.110)				-.165 (.107)
H4: Market Commonality*Repeated Cooperation				.100 (.118)				.100 (.061)				.100 (.074)
H4: Market Commonality²*Repeated Cooperation				-.231 (.270)				-.231* (.100)				-.231* (.117)
R-squared	.136 p<.001	.140 p<.001	.142 p<.001	.149 p<.001	.136 p<.001	.140 p<.001	.142 p<.001	.149 p<.001	.136 p<.001	.140 p<.001	.142 p<.001	.149 p<.001
n=464 Control variables not resulting in improved fit are omitted. Two-tailed tests; one-tailed when hypothesized. * p<0.05 ** p<0.01 *** p<0.001												

Figure 7.1: Relationship between market commonality and opportunism



7.5.3 Hypothesis 4

Hypothesis 4 posited that repeated cooperation also weakens the effect of market commonality on opportunism. In Column 12, the coefficient for *Market Commonality*Repeated Cooperation* is positive, suggesting that the negative effect of market commonality on opportunism is less where repeated cooperation is present. The coefficient for *Market Commonality²*Repeated Cooperation* is negative, suggesting that positive effects of higher values of market commonality on opportunism are less where repeated cooperation is present. Both of these coefficients are negatively related to the main relationship, suggesting that repeated cooperation indeed weakens the main relationship. This is affirmed by the joint test ($F = 3.22, p < 0.05$).

7.6 Postestimation

In this section, I discuss additional procedures to establish consistency of the estimates and to eliminate sources of potential bias insofar as I could. Having established and addressed autocorrelation in the *Opportunism* model at the dyad level, I also tested for autocorrelation in both models arising from firm or temporal sources. In Table 7.7, Durbin-Watson statistics are provided for first-order autocorrelations. In all other cases, I fail to reject the null hypotheses of no positive autocorrelation and no negative autocorrelation at a 95% significance level (Slavin & White, 1977). In the absence of first order correlations, there was no reason to anticipate autocorrelation at other orders.

Table 7.7: Durbin-Watson statistics

	<i>Opportunism</i>	<i>Value Creation</i>
Firm	$d = 1.88$	$d = 2.07$
Dyad	$d = 1.02$	$d = 2.01$
Time	$d = 1.90$	$d = 1.90$

To address endogeneity concerns and assess the consistency of my results, I employed a two-stage selection model. Endogeneity bias refers to systematic but unobserved differences (e.g., dyad level characteristics) that could be driving the regression coefficients. Endogeneity occurs where a broader system of strategic factors that I cannot measure, and perhaps are not yet understood, influence both independent and dependent variables. The inclusion of an extensive set of control variables helps to account for many theoretically evident sources of heterogeneity, but it is impossible to be exhaustive and therefore endogeneity remains a concern.

A two-stage selection model involves introducing a valid instrument that predicts the independent variable in the ‘selection model’ but does not influence the dependent variable in the ‘performance model’ (Martinez, Oxley, & Silverman, 2017). To fulfil this purpose, I chose a dichotomous measure of whether the firm overlaps with the partner in its primary SIC code. It has been shown that firms who encounter each other in their most important markets increase their market commonality to establish forbearance through footholds in each other’s markets (Baum & Korn, 1999; Gimeno, 1999). Thus, this measure of market importance was correlated with my focal predictor, was not a predictor itself, was uncorrelated with the error term, and was therefore a valid instrument (Murray, 2006). The estimation results for the two-stage regression were consistent with the OLS results – there are no systematic differences in direction or significance of the coefficients in the performance model versus those reported in the OLS model (Hausman chi-sq = 0.16; $p > 0.99$) (see Appendix IV for more information). As a result, while I acknowledge that it is impossible to rule out all endogenous bias, to the extent that I have been able to address endogeneity, there does not appear to be any notable evidence of bias in my results.

Further robustness checks were undertaken with measures of opportunism using three and five-year windows for future cooperation. Pairwise correlations are $r=0.98$, $r=0.95$, and $r=0.99$, for three and four, three and five, and four and five-year windows respectively. There were no changes in the direction or significance of the *Opportunism* model coefficients when it was re-estimated with the three or five-year measure as the dependent variable. For the *Value Creation* model, I also examined three and seven-day CARs, in addition to the two-day CARs employed for the main analysis. Pairwise correlations are

$r=0.97$, $r=0.81$, and $r=0.87$, for two and three, two and seven, and three and seven-day CARs measures respectively. Again, the direction and significance of model coefficients were consistent when it was re-estimated with the three or seven-day CARs as the dependent variable.

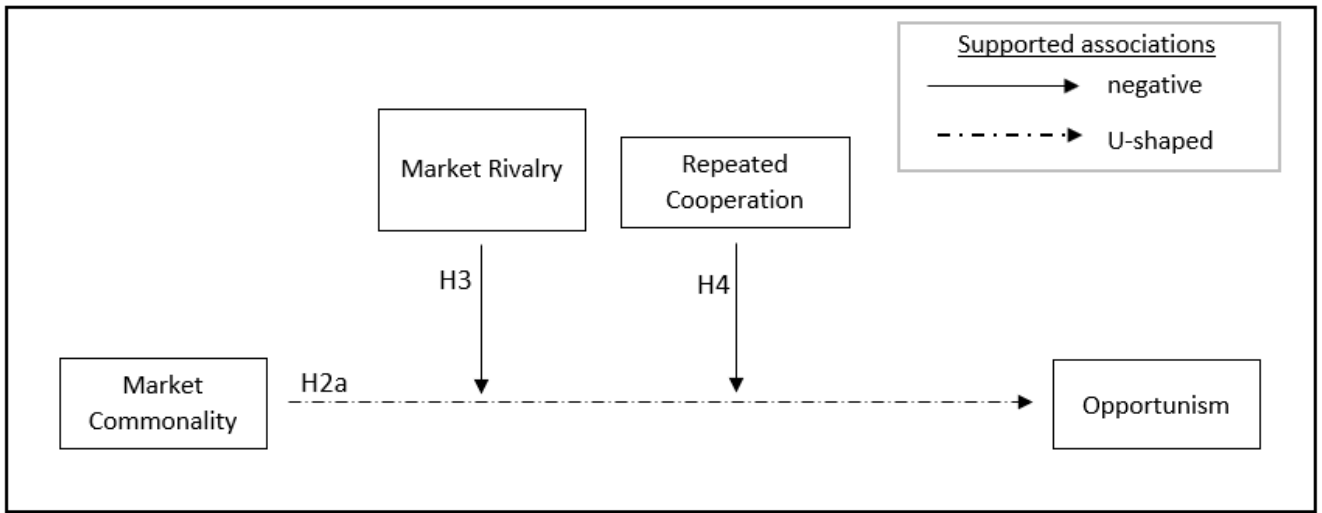
7.7 Chapter summary

In Chapter 7, I have described the analysis procedures and results from the empirical data. I began by reporting the descriptive statistics and pairwise correlations. This was followed by analysis of the event study measure for value creation where I find cross-sectional cumulative abnormal returns of 0.9% (two-day test period), 1.2% (three-day test period) and 1.3% (seven-day test period). I proceeded to evaluate the five hypotheses proposed in the conceptual model. Beginning with the *Value Creation* model, I find insufficient evidence to reject the null in the case of Hypotheses 1 and 2b. In the *Opportunism* model I find evidence to support Hypothesis 2a, 3, and 4. Postestimation analysis affirmed the consistency of these results and ruled out several sources of potential bias. Table 7.8 and Figure 7.2 provide a summary of evidence from the data.

Table 7.8: Summary of results

Hypotheses	Supported?
<p>Hypothesis 1. <i>In coopetition, market commonality is curvilinearly related (taking an inverted U-shape) to firm value creation. Low and moderate levels of market commonality are positively associated with value creation and high market commonality is negatively associated with value creation.</i></p>	No
<p>Hypothesis 2a. <i>In coopetition, market commonality is curvilinearly related (taking a U-shape) to opportunism. Low and moderate levels of market commonality are negatively associated with opportunism and high market commonality is positively associated with opportunism.</i></p>	Yes; $p < 0.05$
<p>Hypothesis 2b. <i>Opportunism is negatively associated with value creation.</i></p>	No
<p>Hypothesis 3. <i>In coopetition, the relationship between market commonality and opportunism is negatively moderated by market rivalry. Market commonality has a weaker association with opportunism, both positive and negative, when market rivalry is high.</i></p>	Yes; $p < 0.05$
<p>Hypothesis 4. <i>In coopetition, the relationship between market commonality and opportunism is negatively moderated by repeated cooperation. Market commonality has a weaker association with opportunism, both positive and negative, when repeated cooperation is high.</i></p>	Yes; $p < 0.05$

Figure 7.2: Relationships supported by the data



In the next chapter, I discuss these findings in terms of extant research and offer contributions, practical implications, limitations, and future extensions arising from my research.

Chapter 8: Discussion and Contributions

8.1 Chapter introduction

In this chapter, the results from the empirical analysis are considered in light of existing theory. I first summarize the findings with respect to the research questions (Section 8.2). Beginning with value creation, the hypothesized effects of market commonality (Hypothesis 1) and opportunism (Hypothesis 2b) on value creation are not supported. I then turn to the effects on opportunism (Hypothesis 2a, 3, and 4), which are all supported. This upholds a curvilinear U-shaped influence of market commonality on opportunism in cooptition, which is weakened by market rivalry and repeated cooperation.

This leads to three core contributions (Section 8.3): (1) identifying and testing informal-market based safeguards against opportunism, (2) providing theoretical resolution for conflicting findings in the literature, and (3) clarifying key moderating effects. In addition, my research advances the wider cooptition literature by establishing conceptual boundaries for cooptition, identifying limitations of the event study method for measuring value creation, and unpacking of how value creation occurs in cooptition (Section 8.4). My research also offers promising extensions for both theories at the heart of cooptition, competitive dynamics and the resource-based view (Section 8.5).

With regard to practical implications (Section 8.6), my findings move beyond simplistic perceptions that have emphasized heightened opportunism and the resultant need for formal safeguards in cooptition. Instead, informal market-based safeguards may be a less

costly and more effective alternative for constraining opportunism. By highlighting firm, dyad, and market-level characteristics affecting opportunism, my research offers a nuanced analysis of where firms may or may not encounter opportunism in cooperation.

8.2 Summary of findings

I now summarize the findings of the empirical analysis. I begin with value creation and the associated empirical model, and then move to the effects on opportunism.

8.2.1 Value creation

With respect to value creation, the research question I set out to answer was: *What influence does the effect of market commonality on opportunism have on firm value creation from cooperation?*

Hypothesis 1 predicted that market commonality has a curvilinear inverted-U shaped influence on value creation. This occurs through opportunism, which Hypothesis 2b predicted is negatively related to value creation. The *Value Creation* regression model did not support either of these hypotheses.

Despite lack of support for the hypothesized effects, the event study established a positive and significant effect of cooperation on value creation across the sample. A cross-sectional stock price ‘bump’ of 0.9% was observed for the two-day test period, 1.2% for the three-day test period, and 1.3% for the seven-day test period. This suggests that, all else being equal, cooperation relationships lead to increased value creation. It endorses the conceptual development in Chapter 2, where moderately strong and balanced competition and cooperation may lead to synergies that enable value creation in cooperation.

8.2.2 Opportunism

With respect to opportunism, my research question was: *What is the effect of market commonality on opportunism in coopetition?*

My findings support Hypothesis 2a, which predicted a curvilinear U-shaped effect of market commonality on opportunism. At low and moderate levels, market commonality increases scope for partner retaliation, which generates a negative effect opportunism in coopetition. When market commonality is high firms must appropriate value from many of the same markets, which reduces the rarity of jointly developed resources. This increases rewards from behaving opportunistically and reverses the initial negative effect.

There was also support for the hypothesized moderating effects of market rivalry (Hypothesis 3) and repeated cooperation (Hypothesis 4). I find that the curvilinear U-shaped relationship between market commonality and opportunism is weaker in the presence of market rivalry and/or repeated cooperation. Market rivalry dampens scope for partner retaliation against opportunism, which reduces the main effect. Repeated cooperation generates relational mechanisms which replace the market-based safeguard provided by market commonality, thereby also reducing the main effect.

8.3 Contributions

The central objective for this research was to develop better theory regarding opportunism in coopetition. My findings suggest that important modifications are necessary regarding how opportunism in coopetition is understood. They challenge the dominant assumption that opportunism is heightened in coopetition, affirm the presence of informal market-

based safeguards against opportunism in cooperation, and resolve conflicting findings in the literature. I now discuss the three contributions arising from my research.

8.3.1 Identifying and testing informal market-based safeguards against opportunism

First, my research advances knowledge of opportunism in cooperation by clarifying when opportunism may be reduced. This challenges a widespread assumption in the cooperation literature that opportunism is heightened in cooperation (Belderbos et al., 2004; Dussauge et al., 2000; Fernandez et al., 2014; Garrette et al., 2009; Gnyawali & Park, 2009; 2011; Lavie, 2007; Park & Russo, 1996; Park & Ungson, 2001; Park et al., 2014b). To date, researchers have emphasized the increased transaction costs from formal safeguards which are perceived to be necessary to safeguard against opportunism (Mitchell et al., 2002; Park & Russo, 1996; Park & Ungson, 2001), or attempted to reconcile how value creation may be achieved despite opportunism (Ansari et al., 2016; Gnyawali & Park, 2011). Through systematic analysis of opportunism in cooperation, my research challenges a dominant assumption at the heart of both these approaches.

In contrast to the widespread view, I demonstrate that opportunism depends on market commonality and, up to a point, may be reduced in cooperation. This clarifies that, in some cases, opportunism is not as severe as the literature assumes and that widespread emphasis on heightened opportunism in cooperation may be premature. There are important ramifications for how extant cooperation research is interpreted and how future research might proceed, both in terms of transaction costs and value creation.

Reduced opportunism in cooperation occurs at low and moderate levels of market commonality through *informal market-based safeguards* that deter opportunism. Building

on the action and response literature of competitive dynamics (Baum & Korn, 1999; Caves, 1984; Chen & MacMillan, 1992; Chen & Miller, 1994; Chen, 1996), I explain how market commonality increases scope for partner retaliation which, up to a point, generates safeguards against opportunism in coopetition. Market-based safeguards against opportunism are a type of informal safeguard that, to my knowledge, have not previously been isolated and tested in the literature.

The identification and testing of informal market-based safeguards has important ramifications for how the transaction costs of coopetition are theorized. Critically, informal market-based safeguards incur less transaction costs than formal contracts because they are self-enforcing (in contrast to formal contracts which require third party enforcement). Therefore, violations may be redressed speedily and informally, and do not need to be documented to the satisfaction of a third party (Dyer & Singh, 1998). Bounded rationality reduces the effectiveness of formal contracts for fully safeguarding opportunism (Cao & Lumineau, 2015; Cavusgil et al., 2004; Deakin & Wilkinson, 1998; Hart, 1988; Williamson, 1979), but informal safeguards offer more holistic protection because they rely on post-event determinations of acceptable behaviors. Transaction costs are less because partners are not required to spend resources anticipating all possible eventualities, nor writing, coordinating, monitoring, and enforcing a formal safeguard (Dyer & Singh, 1998; Telser, 1980).

In several ways, informal market-based safeguards are also more effective for enabling value creation. One is that cost reductions from informal market-based safeguards free up more resources for value creation (Luo, 2006a: 2006b: 2007). A second is that partners have flexibility to adjust agreements “on the fly” (Uzzi, 1997: 48) because eventualities

do not require ex ante specification (Dyer, 1997; Dyer & Singh, 1998; Luo, 2002). A third is that informal safeguards protect against breaches of the ‘spirit’ of an agreement in addition to breaches of the formalized terms (Lumineau & Quélin, 2012; Luo 2006a:2006b). Consequently, a broader spectrum of opportunistic behaviors are safeguarded and partners experience greater freedom and confidence to share resources (Dyer, 1997; Luo, 2006a: 2006b: 2007). A fourth way is that informal market-based safeguards are difficult to imitate because they require time and costs to develop. In contrast to formal contracts which may be easily imitated by others (who also have access to lawyers and third-party enforcers), the superiority and inimitability of market-based safeguards may represent a standalone source of value (e.g., Dyer & Singh, 1998). A fifth is that self-enforcing agreements roll over from one period to the next. While formal contracts are generally fixed length and therefore depreciate, informal safeguards may appreciate over time as firms become more aware of interdependencies between their behaviors (Dyer & Singh, 1998).

The identification of informal market-based safeguards in coopetition constitutes important theoretical progression. Existing theory, dominated by the assumption of heightened opportunism, is not equipped to explain rising pursuit of coopetition in practice (Gnyawali & Park, 2009; Harbison & Pekar, 1998), which is frequently occurring without formal safeguards to constrain opportunism (Ryu & Reuer, 2016). Through development of a new explanation for reduced transaction costs and increased value creation in coopetition, I offer better theory about the dynamics of coopetition and why the phenomenon occurs in the way that it does.

8.3.2 Resolution of conflicting findings in the literature

Second, my research reconciles the conflicting findings reported by the few empirical studies examining opportunism in coopetition. On one hand, some research finds market commonality between partners leads to higher joint venture failure rates (Park & Russo, 1996) with the authors drawing from TCE to argue that such failure occurs through heightened opportunism in coopetition. On the other hand, studies have drawn from multipoint competition logic, which incorporates some aspects of competitive dynamics, to explain empirical findings that suggest reduced opportunism in coopetition (Ryu & Reuer, 2016; Shipilov, 2009). Thus far, these conflicting findings have not been explained and most researchers have tended to focus on the TCE view that opportunism is heightened in coopetition.

By conceptualizing and testing a nonlinear effect of market commonality on opportunism, I provide theoretical resolution for this conflict. At low and moderate levels of market commonality, informal market-based safeguards reduce opportunism in coopetition (e.g., Shipilov, 2009) and limit the requirement for formal safeguards against opportunism (e.g., Ryu & Reuer, 2016). However, when market commonality is high, this effect reverses and opportunism increases, which may lead to more instances of joint venture failure (Park & Russo, 1996).

The conceptualization of both negative and positive effects of market commonality illustrates how these findings may not actually be conflicting. Instead, they may simply reflect varying levels of market commonality in different samples. The identification of a nonlinear effect offers a holistic conceptualization of opportunism in coopetition. Instead

of focusing on an incomplete negative or positive effect, my research provides an explanation that enables researchers to harness both perspectives within a rounded theoretical analysis.

8.3.3 Clarification of key moderating effects

Third, my analysis of key moderators provides a more nuanced understanding of opportunism in cooperation and highlights important dyad and market level characteristics which weaken the main effect.

Specifically, the main relationship between market commonality and opportunism (Ryu & Reuer, 2016; Shipilov, 2009) is negatively moderated by market rivalry and repeated cooperation. Market rivalry constrains the scope for partner retaliation by decreasing the latitude for competitive escalation. Therefore, the potency of partner retaliation, and the extent to which market commonality reduces opportunism, is less when market rivalry is high. Meanwhile, repeated cooperation creates disincentives against opportunism through relational safeguards arising from trust, shared norms, and social relations. These make market-based safeguards somewhat redundant but, when market commonality is a driver of opportunism, they provide a compensatory safeguarding mechanism.

Analysis of market rivalry and repeated cooperation affirms the underlying logic whereby increased scope for partner retaliation is the basis for informal market-based safeguards. Negative moderation was supported both cases, which suggests that market rivalry dampens scope for partner retaliation, whereas repeated cooperation replaces the effect on opportunism. Support for multiple factors affecting the same mechanism (i.e., scope for partner retaliation) provides validation for underlying safeguarding mechanism. The

logic that scope for partner retaliation reduces opportunism may be extended to unpack other important contingencies (e.g., network positioning; Gnyawali & Madhavan, 2001; Stuart, 2003) that may also affect this mechanism.

8.4 Advancement of the coopetition literature

I now discuss important advancements of the coopetition literature. My research offers new insights for coopetition by (1) establishing conceptual boundaries for coopetition, (2) identifying limitations of the event study method for measuring value creation, and (3) enhancing understanding of how value creation occurs in coopetition.

8.4.1 Conceptual boundaries of coopetition

The defining characteristics of coopetition I develop offer much needed clarity concerning the phenomenon's conceptual boundaries and definition. Ambiguity regarding the phenomenon's boundaries has emerged in the literature because the term has been used quite broadly to describe phenomena are fundamentally different to the dyadic view of coopetition (simultaneous competition and cooperation between firms; Bengtsson & Kock, 2000; Gnyawali & Park, 2011). The extant literature does not offer a suitable toolset to effectively distinguish between these different phenomena.

I explain how three defining characteristics delineate coopetition and distinguish it from related phenomena. The first defining characteristic, simultaneity of competition and cooperation between firms, makes coopetition a unique phenomenon that requires reaching beyond conventional literatures of competition and cooperation. By emphasizing the role of intensity and balance within simultaneity, I add further depth to the analysis of

coopetition. The second characteristic, paradoxical interdependence of competition and cooperation, identifies unique challenges and tensions that are at the heart of coopetition. The third characteristic, value creation intent in coopetition, clarifies the core purposes of the engagement and distinguishes coopetition from collusion.

I urge coopetition researchers to limit usage of the label ‘coopetition’ for phenomena that satisfy all three characteristics and to clearly explain how the phenomenon they are studying meets these characteristics. I intend that the defining characteristics can generate consensus about what coopetition is and is not, and drive the accumulation of a cohesive body of knowledge regarding coopetition.

8.4.2 Limitations of the event study method

I also identify important limitations of the event study method for measuring value creation in coopetition. Event studies are a popular approach for operationalizing value creation from inter-firm relationships (Anand & Khanna, 2000; Kale et al., 2002; Oxley et al., 2009; Rai, 2016) because they can pinpoint value creation that is attributable to a particular alliance while holding constant many firm-specific characteristics. Event study results are correlated with managerial assessments of alliance success, which leads scholars to argue that the market does a good job of predicting value creation in cooperative agreements (Kale et al., 2002). Despite these benefits however, I argue that the lack of support for hypothesized value creation effects may arise from the operationalization of value creation and limitations of the event study method, rather than the underlying theory.

My findings raise concerns the event study as a general measure of value creation. The proposed effect of market commonality on value creation was comprised of two mediating effects: the effect of market commonality on opportunism and the effect of opportunism on value creation. I find support for the former effect but not for the latter. Yet the latter effect is established in the literature through extensive scrutiny that employs a range of operationalized measures (Barthélemy, 2008; Jap & Anderson, 2003; Lado, Dant, & Tekleab, 2008). Failure to replicate this effect with the event study method suggests that it may be limited as a general measure of value creation.

Specifically, I argue that the event study has particular limitations for measuring longer-term value creation. An event study relies on shareholder judgements to measure value creation, but shareholders are primarily short-term focused (Bebchuk & Stole, 1993; Vilanova, 2007). This suggests that an event study may accentuate short-term value creation at the expense of longer-term outcomes. In contrast, Hypothesis 1 and Hypothesis 2b emphasized long-term value creation in coopetition, arising when partners have freedom to share resources and confidence to tackle ambitious and complex projects (Bengtsson & Kock, 2000; Garrette et al., 2009; Gnyawali & Park, 2011). An event study is currently popular as an overall measure of value creation, but this potential short-term focus has implications for how the method is employed in strategic management going forward.

8.4.3 Value creation in coopetition

In Chapter 2, I develop new insights to explain how value creation may occur in coopetition. Despite widely observed outcomes of value creation in coopetition, including

technological development (Gnyawali & Park, 2011), disruption (Ansari et al., 2016), and expansion (Garrette et al., 2009), there has been limited theorizing about the unique properties of coopetition that enable these outcomes to occur. By unpacking intensity and balance within simultaneity, and juxtaposing individual implications of competition and cooperation, I provide finer-grained analysis regarding how value creation may occur in coopetition.

Where inter-firm competition and cooperation are strong and moderately balanced in coopetition, I isolate synergies emerging from interplay of their individual implications: pursuit of excellence and resource potential (competition) and relational mechanisms and resource commitment (cooperation). This enables both mutual value creation and firm-specific value creation. By developing these implications, conceptualizing their interplay, and connecting them to value creation, I augment the core contributions regarding coopetition dynamics and the potential for value creation in coopetition. This adds further nuance to how value creation is conceptualized in coopetition and provides a basis for deeper examination in future research.

8.5 Extending underpinning theories

Two theories, competitive dynamics (Chen et al., 1992; Baum & Korn, 1996; Smith et al., 1992) and the resource-based view (Barney, 1991; Lavie, 2006), are central to how inter-firm competition and cooperation are understood, but have been largely overlooked in the study of coopetition dynamics. I now discuss extensions of both theories emerging from my research.

8.5.1 *Competitive dynamics*

By employing competitive dynamics to shed new light on cooperation, I illustrate the theory's strengths and limitations in an important yet underexplored context (Prince & Simon, 2009; van Reeven & Pennings, 2016; Yu & Cannella, 2013). Specifically, I extend the logic of action-response dyads to a setting where they have not previously been considered. As the building blocks of inter-firm rivalry, actions and responses are studied extensively in the competitive dynamics literature (Baum & Korn, 1999; Caves, 1984; Chen & MacMillan, 1992; Chen & Miller, 1994; Chen, 1996), but almost exclusively in a market setting. My research illuminates the utility of studying actions and responses to understand rivalrous behavior in a non-market setting: opportunism in cooperation dyads. Moreover, I demonstrate how the three key drivers of competitive market response, awareness, motivation, and capability (Chen, 1996; Chen & Miller, 1994), are also relevant for retaliation in cooperation.

My research highlights the relevance of competitive dynamics for explaining of inter-firm relationships occurring beyond traditional market confines where the original theory was developed. Firms are embedded in complex webs of interactions, of which market actions and responses represent a mere fraction (Gimeno & Woo, 1996b; Shipilov, 2012; van Wegberg & van Witteloosuijn, 2001). The novel application of competitive dynamics in this research should give encouragement to other scholars seeking to explain diverse forms of rivalrous behavior, including buyer-supplier dyads (e.g., Cox, 2004), units of multiunit firms (e.g., Tsai, 2002), or concurrent sourcing relationships (e.g., Parmigiani, 2007).

Such encouragement, however, is balanced against an important caveat which I noted in Chapter 4. Despite important strengths for explaining these types of interactions, competitive dynamics is characterized an underlying zero-sum logic, where gains for one firm occur at the expense of another and inter-firm engagements are not perceived as a source of value creation. The logic of competitive dynamics overlooks unique interaction properties arising from value creation, which I demonstrate are particularly important in cooperation, and are likely to also be relevant in other types of relationships. Thus, to adequately analyze rivalrous behavior in these settings, it is necessary to introduce additional theoretical insights, such as the RBV, to enable systematic analysis of the value creation dimension.

Ultimately, the practical significance of competitive dynamics may be greater in engagements, such as cooperation, that involve new value creation. While competitive dynamics is most commonly employed to explain how aggression may be constrained in market interactions (Prince & Simon, 2009; Yu & Cannella, 2013), this behavior equates to little more than tacit collusion. Collusion is damaging to consumers and society, and therefore illegal in developed economies. In contrast, extending competitive dynamics to study safeguards against opportunism in cooperation can identify sources of additional value creation, such as limiting wasteful investments in formal contracts and freeing resources to pursue innovation and R&D (Gnyawali & Park, 2011; Jorde & Teece, 1990). By demonstrating the importance of competitive dynamics in non-market interactions, my research opens a promising avenue for revitalization of this literature and generates impetus for explanation of novel, value creating phenomena.

8.5.2 *The resource-based view*

I also extend the RBV to explain both competitive and cooperative elements of the same relationship. Thus far, scholars have mostly applied the RBV to explain either inter-firm competition or inter-firm cooperation. The traditional RBV emphasizes inter-firm competition (Barney, 1991; Dierickx & Cool, 1989; Wernerfelt, 1984), where firms achieve superiority through valuable, rare, inimitable, and non-substitutable resources that are heterogeneously distributed and not easily tradeable. Meanwhile, the external RBV is more closely aligned with inter-firm cooperation and how firms may rely on each other to access critical resources and capabilities that they cannot satisfy alone (Dyer & Singh, 1998; Lavie, 2006).

My research extends these perspectives by drawing from resource-based logic for both competition and cooperation, affirming its relevance for both constituent elements of cooperation. It is widely acknowledged that cooperation is motivated by synergies between competitors' resources and capabilities which emerge because they are targeting similar customers and confronting similar challenges (Dussauge et al., 2000; Gnyawali & Park, 2009; 2011; Ritala & Hurmelinna-Laukkanen, 2009). Yet the competitive element is largely overlooked: resource-based concerns also motivate opportunism when market commonality is high. My research extends the theoretical foundations for cooperation by clarifying that the RBV is relevant for both the competitive and cooperative elements of the phenomenon.

8.6 Practical implications

This research has five important practical implications. First, in Chapter 2, I make clear what coopetition is and is not, and, through the defining characteristics, provide a framework for managers to understand and delineate insights from the literature. At present, the term ‘coopetition’ is used broadly and narrowly to offer managerial insights regarding phenomena that are inherently different. For example, Afuah (2000) studies relationships with buyers, suppliers, and competitors and labels all of these phenomena as ‘coopetition’, whereas Gnyawali & Park (2011) view coopetition as cooperation among direct competitors who are horizontally adjacent on the industry value chain. This creates challenges for managers seeking insights for their dyadic coopetition relationships because it is likely that broader usages of the coopetition term may be less relevant. I explain how three defining characteristics, simultaneity of competition and cooperation between firms, paradoxical interdependence of competition and cooperation, and value creation intent, make dyadic coopetition a unique and distinct phenomenon. This is an important clarification for managers, who may employ these characteristics as a basis for distinguishing among the various phenomena that are labelled ‘coopetition’ in the literature.

Second, I illuminate the value creation potential of coopetition, offer novel explanations about when value creation may occur, and explicate critical factors that may enhance or diminish value creation in coopetition. Despite widely observed outcomes of value creation, the literature is silent on how value occurs, or how managers may improve value creation in their coopetition relationships. Through the event study method, my research affirms that coopetition has an overall positive impact on value creation. This supports

insights from extant qualitative (Bengtsson & Kock, 2000; Gnyawali & Park, 2011) and quantitative (Park et al., 2014a; Ritala, 2012) studies. Critically, however, my research isolates complementarities from the interplay of individual competitive and cooperative implications that enable value creation in cooptition: pursuit of excellence and resource potential (competition), and relational mechanisms and resource commitment (cooperation). Such complementarities enable both mutual value creation and firm-specific value creation. In addition, I highlight key factors, such as intensity and balance within simultaneity, that determine the level of value creation (if any) that emerges. It is intended that managers may draw from these insights to understand how value creation can be cultivated, sustained, and enhanced in cooptition.

Third, my findings indicate an overall positive message for managers interested in cooptition. I challenge simplistic perceptions and offer evidence that opportunism in cooptition may not be as severe as the literature assumes. In the face of complex, uncertain, and potentially long-term rewards from cooptition (e.g., Fernandez et al., 2014; Gnyawali & Park, 2011; Hamel, 1991), scholarly assumptions regarding heightened opportunism and costly safeguards may unnecessarily deter managers who must preserve short-term performance (e.g., Lages, Jap & Griffiths, 2008; Rappaport, 2005). However, my research clarifies that, when market commonality is low and moderate, market-based safeguards can reduce opportunism in cooptition. Given the benefits of cooptition for firms (Bengtsson & Kock, 2000; Garrette et al, 2009) and society (Gnyawali & Park, 2011; Jorde & Teece, 1990), this addition to managerial knowledge can spur increased adoption and fuel firm and economy-level development.

Fourth, the identification of informal market-based safeguards, which may replace formal safeguards in some cases, supports more informed managerial decision making regarding cooperation governance. Formal safeguards are accompanied by significant costs which are heavily front loaded (Williamson, 1985) and can never fully safeguard against opportunism. However, informal market-based safeguards incur fewer transaction costs and offer more holistic protection because they rely on post-event determinations of acceptable behaviors. Thus, firms may participate in cooperation with less up-front costs from formal safeguards and where resources may be shared more freely and with less fear of opportunism. As governance decisions are central to the success of inter-firm relationships (Cao & Lumineau, 2015; Caniels, Gelderman, & Vermeulen, 2012; Faems, Janssens, Madhok, & Van Looy, 2008), the new insights I offer regarding when informal market-based or relational safeguards may be relied upon, vis-à-vis when formal safeguards are required, can help managers to achieve whatever they consider ‘success’ in cooperation.

Fifth, this extensive analysis of opportunism in cooperation, spanning firm, dyad, and market-level characteristics, provides a fine-grained understanding of where firms are more or less likely to encounter opportunism in their cooperation relationships. I highlight how the development and realization of benefits in cooperation will be influenced by the level of market commonality and repeated cooperation with a given partner, as well as the degree of rivalry in common markets. My research can therefore fuel better managerial decision-making with regard to partner selection. My research suggests that it will be more challenging to safeguard opportunism in cooperation relationships where a firm shares almost all of its markets with a partner. In addition, firms initiating new cooperation

relationships should be prepared to rely less on informal market-based safeguards where repeated cooperation with a partner is high, or where the extent of rivalry in common markets is high.

8.7 Limitations

There are a number of limitations emerging from my research. First, future cooperation is a rather blunt measure that only captures instances of opportunism which are sufficiently egregious to alter the partner's likelihood of working with the firm again. There are subtler opportunistic behaviors that may be routinely pursued by cooperation partners, but which are not measured in my research. Vigilant interpretation should not extrapolate these findings to predict effects on milder opportunistic behaviors. Despite limitations however, this measure may represent steps forward regarding how opportunism is operationalized in the literature. Previous efforts have struggled to measure opportunism, relying on measures such performance outcomes (Park & Russo, 1996; Shipilov, 2009) or governance decisions (Ryu & Reuer, 2016). These measures invite confounding biases because they are quite far removed from where opportunistic behavior actually occurs. By focusing on partner reactions to firm opportunism, the future cooperation measure may be closer to the actual behavior, while capturing variety in the intensity of opportunistic behavior (reflected by the extent to which the partner chose to curtail its cooperation).

Second, the broadly positive effect of cooperation on firm value creation is subject to an important caveat. In addition to the limitations discussed, the event study method introduces the possibility of reverse causality. Abnormal stock returns reflect investors' initial expectations for the alliance, but initial high expectations, if shared with managers,

may reduce conflict with the partner and/or enhance motivation or productivity (Olk, 2006). In such cases, shareholders' expectations may influence value creation; rather than value creation determining shareholders' expectations.

Third, my findings are based on firms involved in dyadic cooperative R&D agreements where at least one partner was active in the global semiconductor industry. This could limit the generalizability of my results in other settings. In high tech industries like semiconductors, tacit knowledge is often an important source of value creation (von Hippel, 1988). Tacit knowledge may be particularly susceptible to opportunism (e.g., Hamel, 1991; Khanna et al., 1998). It might also be more difficult to protect with formal contracts, so the relevance of market-based safeguards could be greater. Further tests with multi-industry samples can address these concerns.

Fourth, while I have argued that constraining aggression in coopetition is beneficial to society in the specific setting of the coopetition agreement, there may be other aggregate effects that are damaging. For example, scope for partner retaliation in coopetition could also be employed as a mechanism for dampening rivalry across a portfolio of competitive engagements (e.g., Amir et al., 2017). The development of measures for overall welfare implications, focusing on "the state of competition with, as compared to without, the relevant [coopetition] agreement" (Federal Trade Commission and U.S. Department of Justice, 2000: 4), is a logical advancement of this research.

8.8 Future research

By shedding new light on opportunism in coopetition, my research highlights informal market-based safeguards and establishes a basis for deeper understanding of opportunism

and associated benefits and costs. Four important extensions arising from my contributions are now discussed.

First, I find that informal market-based safeguards are an effective deterrent against opportunism to a point, but it is improbable that all types of opportunism are deterred in equal measure. To enable more nuanced understanding, it will be valuable to identify types of opportunism that are more or less likely to be safeguarded. Promising avenues could include the visibility of opportunism within common markets, consequences for the partner's most important markets (e.g., Gimeno, 1999), implications for the partner's resource-based advantages (e.g., Markman et al., 2009), or the proactive or reactive nature of the opportunistic behavior (e.g., Luo, 2007).

Second, I have unpacked scope for partner retaliation against opportunism as the underlying mechanism for enabling market-based safeguards but incorporating other firm and dyad level determinants will generate a more nuanced understanding. Important future research directions could include the firm and partner's positioning within their wider networks, which I expect to be a key antecedent of scope for partner retaliation (e.g., Gnyawali & Madhavan, 2001; Gnyawali et al., 2006; Sanou et al., 2016). A partner who is a central actor in their network is not dependent on a small number of ties for accessing external resources and may draw on greater volume and speed of resource access for potential retaliation. Therefore, central actors are less worried about competitive escalation with any single partner and may be more likely to respond with competitive aggression (Gnyawali et al., 2006; Sanou et al., 2016). Scope for retaliation may also vary depending on the degree of symmetry between the network positions of the firm and the partner (e.g., Gnyawali & Madhavan, 2001). Simultaneous analysis of market and

network-level factors will build further depth regarding how market-based safeguards are understood.

Third, the effect of market rivalry on market-based safeguards represents a starting point for analysis of contextual determinants, but I urge further scrutiny here also. Coopetition is particularly significant for technological innovation (Ansari et al., 2016; Garrette et al., 2009; Gnyawali & Park, 2011), so exploring the unique dimensions of these contexts will be important. On one hand, firms in these contexts are pushed towards coopetition because of short product life-cycles (Gnyawali & Park, 2009), but these could also be a source of market rivalry that inhibit market-based safeguards. Similarly, high R&D investments for technological innovation may be a functionally equivalent deterrent for firms who are worried about destabilizing joint efforts. On the other hand, technological resources may require greater protection from opportunism, while market-based safeguards may be more relevant among technology firms who are active across many markets. It is clear that further unpacking of contextual factors like these will be critical for augmenting this initial identification and testing of market-based safeguards.

Fourth, my research highlights a need to focus on value creation measures that can balance short-term value creation with longer-term outcomes. Coopetition research often relies on longitudinal case studies (Ansari et al., 2016; Bengtsson & Kock, 2000; Gnyawali & Park, 2011), which facilitate some evaluation of long-term value creation but have limited generalizability. It is therefore necessary to explore longer-term measures that can be applied to large samples. Longitudinal analysis of financial measures or stock performance might be one approach, but these measures are highly susceptible to confounding influences from broader strategic factors. A suitable compromise might be

to track patenting activities over a period of time (e.g., Ahuja & Katila, 2001; Sorensen & Stuart 2000; Spencer, 2003; Srivastava & Gnyawali, 2011; Stuart, 2000). A new filing in a patent class associated with a coopetition relationship represents a unique and externally validated element of knowledge (Ahuja, 2000; Ahuja & Katila, 2001) that the firm has developed from coopetition (e.g., Park et al., 2014b). Within a single industry setting where firms' patenting propensities are similar, patenting activity may be a suitable measure of value creation over time from coopetition (Ahuja, 2000; Rai, 2016).

8.9 Conclusion

The phenomenon of coopetition is receiving increasing attention, but the academic literature is dominated by a widespread assumption that opportunism is heightened in coopetition. This is at odds with industry proceedings, which provide strong evidence that the literature is poorly equipped to explain dynamics of coopetition and their implications for value creation. My research addresses this important deficit through systematic analysis of opportunism in coopetition. I identify and test informal market-based safeguards that reduce opportunism in coopetition, thereby challenging the dominant view in the literature. By clarifying opportunism in coopetition, I resolve conflicting findings and establish a robust basis for examining coopetition benefits and costs in future research. For managers, my research explains an efficient and effective safeguard against opportunism that is not previously identified. This suggests that firms may participate in coopetition with less up-front costs and where resources may be shared more freely.

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Appendices

Appendix I: Systematic Literature Review Method

A systematic review proved an appropriate means for identifying key contributions in a scientific and transparent manner (Tranfiel, Denyer, & Smart, 2003). The systematic literature review method was undertaken to establish implications, value creation opportunities, and defining characteristics arising from simultaneous inter-firm competition and cooperation.

I considered relevant conceptual and empirical papers. Following an intensive trial and error phase, I adopted a simplistic but effective search string; ‘compet* AND cooper*’ OR ‘coopet*’ OR ‘co-opet*’ (Bengtsson & Raza-Ullah, 2016; Bouncken, Gast, Kraus, & Bogers, 2015). I conducted this search in six databases (Table A.1), limiting returns to academic journal articles, books or book chapters published in English. In multi-disciplinary databases, returns were limited to business, management and economics-themed papers (in their broadest sense). This was an iterative process and I employed a checklist of twenty-one important papers from an initial scoping review to assist in determining when saturation was achieved. I also manually searched six special issues on coopetition and related themes.

Table A.1: Databases included in systematic literature review

Academic Search Complete and all related EBSCOhost databases	26 databases hosting management journals including <i>Journal of Management</i> , <i>Academy of Management Review</i> and <i>British Journal of Management</i> . 463 sources were returned, of which 50 were determined broadly relevant to the specified criteria.
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Web of Science	Hosting more than 12,000 international and regional journals including <i>Industrial Marketing Management</i> and <i>Research Policy</i> . Of the 307 returns, 62 were broadly relevant to the review question.
Scopus	Comprehensive source of book sources and journals such as <i>Technology Analysis & Strategic Management</i> . From the 363 returns, 93 were broadly relevant.
ScienceDirect	A small but select group of sources not also covered by Scopus, including <i>Journal of International Management</i> and <i>Telecommunications Policy</i> . Of the 60 returned sources, 27 were broadly relevant.
Emerald Management	Emerald Management hosts 170 business and management journals. Of 56 hits, 19 were broadly relevant.
JSTOR	Hosting 2,000 journals including <i>Strategic Management Journal</i> . Of 300 returns, 86 were broadly relevant.

Following the removal of duplicates, 159 broadly relevant sources remained, to which I added a further three. Two were found through subject-specific Google Scholar alerts (title: coopetition) and the third was an advanced publication from *Strategic Management Journal*. I then applied the 162 remaining sources to the inclusion criteria in Table A.2. The analysis focused on implications, value creation opportunities, and defining characteristics arising from simultaneous inter-firm competition and cooperation.

Table A.2: Inclusion criteria for final analysis

1. Conceptual discussion or empirical findings about the unique implications or defining characteristics of simultaneous inter-firm competition and cooperation.
2. Conceptual or empirical insights regarding value creation opportunities available from simultaneous inter-firm competition and cooperation.

Papers meeting one or both criteria were included for final analysis. Where there was no evidence of either criterion following a full read of the paper, sources were omitted. Quantitative outcomes of this process are broken down in Table A.3. Bibliographical records were maintained for all sources and justifications were recorded for the sources that were excluded at this stage.

Table A.3: Results following the application of the inclusion criteria

Conceptual discussion or empirical findings about the unique implications or defining characteristics of simultaneous inter-firm competition and cooperation.	29
Conceptual or empirical insights into value creation opportunities available from simultaneous inter-firm competition and cooperation.	61
Did not meet the criteria and were excluded from the analysis	72

I proceeded with analysis of the remaining 90 sources and used MaxQDA to develop a coding protocol. I undertook a systematic search of all reference lists for previously unidentified research that was potentially important. Including duplicates, this produced a further 312 references. An abstract search narrowed this to 98 sources and the application of the inclusion criteria (Table A.2) refined it to 70. A further three iterations of systematic searching of references yielded 19 more sources. At that point, I did not identify any new sources. In total, 179 sources were identified through the systematic literature review method.

Appendix II: Time Series Standard Errors

As the variance of the test period is subject to additional volatility induced by the alliance announcement (Brown & Warner, 1985), standard errors are derived from the estimation period (Campbell et al., 1997).

The variance for the estimation period is the sum of squared residuals divided by $n-k-1$ (where n is the number of days in the estimation period and k is the number of independent variables):

Equation A.1: Variance:
$$\text{Var}[AR] = \frac{\sum_{i=1}^n \hat{\epsilon}_i^2}{n-2}$$

Following Campbell and colleagues (1997), cross-sectional variance for z events may then derived as:

Equation A.2: Cross sectional variance:
$$\text{Var} [\overline{AR}] = \frac{1}{z^2} \sum_{i=1}^z \frac{\sum_{i=1}^n \hat{\epsilon}_i^2}{n-2}$$

Assuming independence of observations (Anand & Khanna, 2000; Corrado, 2011), cross-sectional test-statistics for a given day in the test period may then be established:

Equation A.3: Cross-sectional test statistics:
$$T = \frac{\overline{AR}}{\sqrt{\text{Var} [\overline{AR}]}}$$

Test statistics for cumulative cross sectional $CARs$ follow a time series standard deviation model where the standard error is adjusted for number of days (t) in the relevant test period (Campbell et al., 1997):

Equation A.4: Cumulative cross-sectional test statistics:
$$T = \frac{\overline{CAR_t}}{\sqrt{t} \sqrt{\text{Var} [AR]}}$$

Appendix III: Multicollinearity

There is structural multicollinearity in the sample induced by the mathematical transformations necessary for *Market Commonality*², as well as the interactions between market commonality and market rivalry. This raised multicollinearity concerns regarding four variables: *Market Commonality*, *Market Commonality*², *Market Commonality*Market Rivalry*, and *Market Commonality*²**Market Rivalry*. In the *Opportunism (Value Creation)* model, variance inflation factors (VIFs) for these variables are 16.97 (7.41), 15.98 (6.82), 13.82, and 13.80 respectively.

Multicollinearity creates difficulties for inferences because, when highly correlated independent variables are included in the same model, the variance of each depends on which others are included (Wooldridge, 2013). Conversely, when independent variables are perfectly uncorrelated, they have the same variance, regardless of what other independent variables are included in the model.

Multicollinearity is not problematic where collinearity is limited to two variables whose effect is intended to be interpreted jointly. Specifically, Hypothesis 2a, examining the effect of market commonality on opportunism, involves interpreting two collinear variables (*Market Commonality*, *Market Commonality*²) as part of the same effect. In such cases, multicollinearity does not obstruct inferences.

An initial appraisal of the interaction terms, *Market Commonality*Market Rivalry*, and *Market Commonality*²**Market Rivalry*, suggest that multicollinearity could be problematic in the *Opportunism* model. There are now four variables with high VIFs to be interpreted as two independent effects. Given the instability in the variances of

collinear variables, multicollinearity creates difficulties when it comes to identifying multiple effects (Wooldridge, 2013).

However, closer observation reveals that the severe collinearities are contained within each independent effect. The source of the high VIFs are pairwise correlations: on one hand between *Market Commonality* and *Market Commonality*², and on the other between *Market Commonality*Market Rivalry* and *Market Commonality*²**Market Rivalry*. Both pairs are intended for joint interpretation, rather than individual interpretation. The pairwise correlations between the independent variables and the interaction terms (Table 7.1) are significantly below the $r=0.8$ threshold at which multicollinearity is considered severe (Hair, Anderson, Tatham, & Black, 2013). Therefore, multicollinearity does not obstruct the evaluation of the hypotheses. VIFs for all other variables in the models does not exceed 4.08.

Appendix IV: Two-stage Selection Model

Table A.4: Two-stage selection model

	<i>DV: Market Commonality Selection Model</i>	<i>DV: Opportunism Performance Model</i>	<i>DV: Opportunism OLS Estimates</i>
Constant	.241** (.088)	-.135 (.304)	-.142 (.303)
Market Importance	.026*** (.006)	-0.009 (.022)	
Market Rivalry	.018*** (.002)	.002 (.008)	.002 (.008)
Firm Size α	-.021*** (.006)	-.048* (.020)	-.048* (.020)
Firm Total Alliances	-.000 (.000)	-.001* (.001)	-.001* (.000)
Repeated Cooperation	.005 (.003)	-.007 (.012)	-.008 (.012)
Size Similarity	-.322*** (.089)	.537 (.311)	.540 (.310)
Age Similarity	.020 (.016)	.110* (.054)	.108* (.054)
Partner's Market Commonality	.023 (.015)	-.053 (.051)	-.053 (.051)
Similarity of Market Commonality	.008 (.015)	.051 (.051)	.051 (.051)
Partner's Total Alliances	.000 (.000)	-.000** (.000)	-.001** (.000)
Market Commonality ²	1.747*** (.038)	.463 (.313)	.473 (.312)
Market Commonality*Market Rivalry	.302*** (.016)	.043 (.074)	.043 (.074)
Market Commonality ² *Market Rivalry	-.566*** (.036)	-.165 (.155)	-.165 (.155)
Market Commonality*Repeated Cooperation	.136*** (.034)	.096 (.119)	.100 (.118)
Market Commonality ² *Repeated Cooperation	-.201* (.078)	-.225 (.270)	-.231 (.270)
Market Commonality		-.238 (.163)	-.251 (.160)
R-squared	.943	.149	.149
p-value	<i>p</i> <0.001	<i>p</i> <0.001	<i>p</i> <0.001
n=464 * <i>p</i> <0.05 ** <i>p</i> <0.01 *** <i>p</i> <0.001 H₀: difference in coefficients not systematic: Hausman chi-sq = 0.16; <i>p</i>>0.99.			

