Coopetition as an emerging organisational strategy for supply chain resilience: an exploratory study of the UKCS oil and gas sector.

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Coopetition as an Emerging Organisational Strategy For Supply Chain Resilience – An Exploratory Study Of The UKCS Oil And Gas Sector.

Eunice Yewande Oke

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Eunice Yewande Oke

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AUTHOR'S DECLARATION

I hereby declare that this thesis is entirely my own work, except where explicit acknowledgement is made to the contribution of others, and this thesis has not been submitted for any other degree at the Robert Gordon University or any other institution.

Eunice Y Oke

December 2020

This is for you; mum and dad.

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ABSTRACT

Coopetition, a form of inter-organisational relationship, which combines competitive and collaborative theories, have gained the interests of academics and practitioners in Inter-Organisational Studies. However, despite the numerous extensive coopetition reviews, several questions remain unanswered, especially with regards to the formation of the strategy. Although, studies have acknowledged that coopetition can occur unintentionally, particularly among organisations in pre-existing collaborative relationships; it remains unclear how or if the nature of formation affects the performance or outcome of the coopetitive relationship. Thus, necessitating continued research efforts into the study of coopetition as an emergent strategy.

In line with the above, this research addresses issues in coopetition studies specifically to uncover the relationship between the formation of coopetition alliances and its performance. The study argues that antecedents for successful intentional coopetition may not apply in coopetition that emerges unintentionally. Hence, using the UK Oil and Gas Industry as a case study, this research investigates some of the factors that can improve the performance of emergent coopetition, such as its management, form of governance, and the role of dedicated alliance functions. The study compares the antecedents for successful deliberate coopetition, with the performance of unintentional coopetition.

Drawing upon research from inter-organisational studies, and interviews of Oil and Gas industry experts, this study proposes some hypotheses and a conceptual model relating to the interactions of the governance structure, control mechanisms and management on the performance of both intentional and unintentional coopetition. Additionally, it investigates the role of supply chain flexibility on coopetition performance. The structural equation model is tested using empirical data obtained through web-based questionnaires from 380 supply chain professionals in the Oil and Gas Industry.

The results of this study confirm that the management technique and control mechanisms have a significant effect on the outcome of both intentional and unintentional coopetition. In contrast, the flexibility of the supply chain has little impact on the performance of the alliance. The study contributes to inter-organisational studies by demonstrating that the presence of a dedicated alliance function and contractual agreements are critical antecedents in the formation of a coopetitive alliance, including emergent coopetition. The study also highlights the study limitations and recommends areas for further research.

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GLOSSARY OF TERMS

Abbreviation	Meaning
AMC	Awareness, Motivation and Capability
BP	British Petroleum
CFA	Confirmatory Factor Analysis
CIF	Coopetition Implementation Framework
CSF	Critical Success Factor
DV	Dependent Variable
EFA	Exploratory Factor Analysis
ERP	Enterprise Resource Planning
EU	European Union
FPAL	First Point Assessment
ICP	Intended Coopetition Performance
IO	Inter-organisational
IOR	Inter-organisational Relationship
IORs	Inter-organisational Relationships
IOS	Inter-organisational Studies
IV	Independent Variable
JIP	Joint Industry Projects
JOA	Joint Ownership Agreement
JV	Joint Venture
MNC	Multi-National Companies
MNE	Multi-National Enterprise
NPD	Norwegian Petroleum Directorate
OG	Oil and Gas
OGA	Oil and Gas Authority
OGC	Oil and Gas Companies
OGI	Oil and Gas Industry
RBV	Resource Based View
RDT	Resource Dependency Theory
RG	Relational Governance
SC	Supply Chain
SCF	Supply Chain Flexibility
SCM	Supply Chain Management
SEM	Strucural Equation Modelling
SET	Social Exchange Theory
TCE	Transactional Cost Economics
TG	Transactional Governance
UCP	Unintended Coopetition Performance
UK	United Kingdom
UKCS	United Kingdom Continental Shelf

Chapter 1: INTRODUCTION

1.1 CHAPTER INTRODUCTION

As a result of the rapid technological advancement and development of the global economy, organisations are exploring more innovative strategies to retain their competitive advantage (Luo, 2007; Dagnino et al. 2009; Della Corte et al. 2016; Cygler et al. 2018). One of such strategies is coopetition; where competing organisations engage in collaborative endeavours to improve their organisational performance (Brandenburger and Nalebuff, 2000; Renna and Argento, 2012; Bouncken, 2015). This form of alliance is common in the aviation (Klimas, 2016; Sharma, 2017; Fernandez et al. 2018), automobile (Wilhelm, 2011; Rusko, 2015), and telecommunication (Basole, 2015; Ritala, 2018) industries. An example of this strategy is the relationship between Samsung and Apple. Despite being market leaders in the smartphone industry, Samsung is one of the major suppliers of chips and display units for Apple smartphones (Velu, 2018).

The application of the coopetition strategy in various industries, as highlighted above, demonstrates that Inter-Organisational Relationships (IORs) among competitors is gaining traction. Organisations now recognise the importance of interacting with other organisations, to cope with the unstable, fast-changing and challenging business environment (Renna and Argento, 2012; Bouncken, 2015). With the increasing rate of globalisation, organisations can no longer exist in isolation and need to interact with other organisations both within and outside its supply chain to become more efficient and retain their competitive advantage (Bogers et al., 2018). Hence, collaboration amongst competitors is becoming a more appealing strategy in the current business environment to improve productivity in organisations (Devece et al., 2017; Shipilov et al., 2018).

Although the coopetition strategy is now gaining popularity (Bengtsson and Raza-Ullah, 2016; Devece, 2019), the elements of coopetition – collaboration and competition, have traditionally been considered separately and independently in management literature. The competitive perspective focuses on attaining competitive advantage for the organisation (Porter, 1980; 1989; 1996; Barney, 1991; Porter and Kramer, 2002; Stonehouse, and Snowdon, 2007; Madsen and Walker, 2015), while the collaborative aspect seeks to create mutual benefits through collective actions (Contractor and Lorange, 1988; Dodgson, 1992; Todeva, and Knoke, 2005; Adobor, 2006; Barnes et al., 2012; Bouncken, 2015).

Recent studies show that treating the collaboration and competition constructs as mutually exclusive strategies are radical and only represent a fraction of reality, pointing that the constructs can co-exist for increased value creation (Brandenburger and Nalebuff, 1998; Padula and Dagnino, 2007; Bouncken et al., 2015; Ritala et al., 2016; Chou and Zolkiewski, 2018). For example, Tanriverdi and Küçükyilmaz (2017), found that many organisations do not single-handedly possess the capabilities and resources to compete in the hostile business environment, and are unwilling to assume the risks that may arise as a result of the rivalry. Which is in line with Bouncken (2015) observation, that competition can hinder the benefits obtainable from the interdependencies among organisations. Bouncken (2015) also stresses that underestimating the role of competition in collaborative alliances can increase the risks within the interaction, such as unintentional knowledge leakage. Thus, emphasising the importance of coopetition to address the shortcomings of both constructs (Bradenburger and Nalebuff, 1998; Bengtsson and Kock, 2000; Bouncken et al., 2015; Dahl et al., 2016; Bengtsson et al., 2016; Devece et al., 2019).

The existing coopetition literature perceives coopetitive interactions as the most beneficial relationship that can exist among competitors (Bengtsson and Kock, 2000; Bouncken et al., 2015). They argue that organisations can improve their performance and strengthen their competitive capabilities by pooling valuable resources from coopetitive relationships (Lado et al. 1997; Bengtsson and Kock, 2000; Gnyawali et al. 2006; Bouncken et al., 2015; Ritala, 2018). According to Chen and Miller (2012), the associated benefits of coopetition are significant, particularly when organisations seek to develop new innovative capabilities and explore new markets.

Despite the associated benefits of coopetition, some authors argue that the risks involved in the complicated alliance outweigh the benefits, which may cause the relationship to fail (Park and Russo 1996; Kim and Parkhe 2009). Several publications have likened to the coopetition construct to 'sleeping with the enemy' (Coy, 2006; Nevin, 2014). The risk of opportunism (Dowling et al. 1996), asymmetric of benefits (Lavie, 2006), uncontrolled knowledge leakage (Cygler and Sroka, 2017), high rate of conflicts (Cygler et al. 2018) are some of the disadvantages of coopetition.

Nonetheless, studies have shown that integrating collaborative and competitive perspectives have paved the way for the formation of a body of knowledge where organisations have the opportunity to move from a zero-sum mindset to a positive-sum mindset (Table 1.1:

Characteristics of Inter-Organisational Interactions.), which increases the value for the organisations (Bengtsson and Kock, 2000; Dagnino, 2009; Mocciaro and Minà, 2009).

	Competition	Collaboration	Coopetition
Interest in value creation	Conflicting interest	Fully converging interest	Partially converging interest
Type of game	Win-Lose game (Zero-Sum)	Balanced positive-sum game	A balanced but variable positive-sum game

Table 1.1: Characteristics of Inter-Organisational Interactions.

Source: Dagnino and Mina, (2011 p.6)

In the late 1980s, management studies began to develop a different view of the customary win-lose interactions between competitors, which involved more collaborative models such as partnership, joint ventures (JV), and strategic alliances. This shift from a win-lose to a win-win viewpoint materialised because of the emerging interests that made the integration of heterogeneous resources, skills and capabilities to improve the performances of the individual firms justifiable (Dyer and Singh, 1998). Notwithstanding, literature was still fixated on competitive or cooperative relationships with the assumption that coopetition is irrational (Smith and Lewis, 2011).

Even though Cherrington (1976), traces the origin of the word coopetition to 1913, where it was used to describe the relationship between oyster merchants, the concept only gained the attention of scholars in 1996, after it was conceptualised by Brandenburger and Nalebuff (1996), through their book 'coopetition', as well as other seminal work by pioneer authors such as Dowling et al., 1996; Lado et al., 1997; Bengtsson and Kock, 1999; Bengtsson and Kock, 2000. Consequently, the inherent benefits of incorporating the contradictory and interrelated elements; cooperation and competition have been subject to rigorous studies, thereby setting in motion the formation of a theoretical body of research regarding coopetitive inter-organisational relationships (IOR) where organisations engage in a win-win game (Bengtsson and Kock, 2000; Dagnino, 2009).

The coopetition strategy is becoming a fast-growing and widespread phenomenon attracting interest in both the academic and industrial practices. Since its conceptualisation by Brandenburger and Nalebuff (1996), there have been studies in different theoretical fields

including strategic alliance (Khanna et al. 1998; Das and Teng 2000; Dussauge et al. 2000; Clarke-Hill et al. 2003; Wang and Krakover 2008; Dagnino, 2009; Garrette et al. 2009; Oxley et al. 2009; Rai 2016; Devece 2019; Zacharia, 2019), innovations (Quintana-García and Benavides-Velasco 2004; Cassiman et al. 2009; Gnyawali and Park 2009; 2011; Ritala and Hurmelinna-Laukkanen 2009; 2013; Mention 2011; Ritala, 2012; Bouncken and Kraus, 2013; Ritala et al. 2016; Bouncken et al. 2018; Chai et al. 2019), international business (Luo 2004; 2005; 2007; Morris et al. 2007; Kim and Parkhe, 2009; Bengtsson and Kock, 2014; Shu et al. 2017; Damayanti, 2019; Zacharia, 2019), marketing (Luo et al. 2006; Bello et al. 2010; McCamley and Gilmore, 2017; Chiambaretto and Le Roy, 2018; Chai et al. 2019), new product development (Fernandez et al. 2014; Yami and Nemeh 2014; Estrada, 2016; Bouncken et al. 2018; Bouncken and Fredrich, 2019), and supply chain (Bakshi and Kleindorfer 2009; Li et al. 2011; Wilhelm 2011; Power and Vlachos, 2016; Yan et al. 2019). Additionally, there have been coopetition studies on different levels of analysis, including coopetition in the various organisational level (Tsai 2002; Luo et al. 2006; Gast et al., 2015; Stadtler and Van Wassenhove, 2016; Chiambaretto et al. 2018), horizontal coopetition (Luo et al. 2007; Garrette et al. 2009; Kumar 2010; Luo et al. 2016; Petter et al. 2017), vertical coopetition (Lechner, 2016; Wilhelm, 2018; Chai et al. 2019).

The growing interest in coopetition studies has resulted in an increasing number of publications, within the subject area (Bengtsson and Raza-Ullah, 2016; Bouncken et al., 2016; Hoffman et al., 2017). In fact, a recent study by Devece (2019), reveals an 81% increase in the number of coopetition publications, which corroborates Bengtsson and Raza-Ullah (2016), evidence of coopetition growth (*Figure 1.1*).
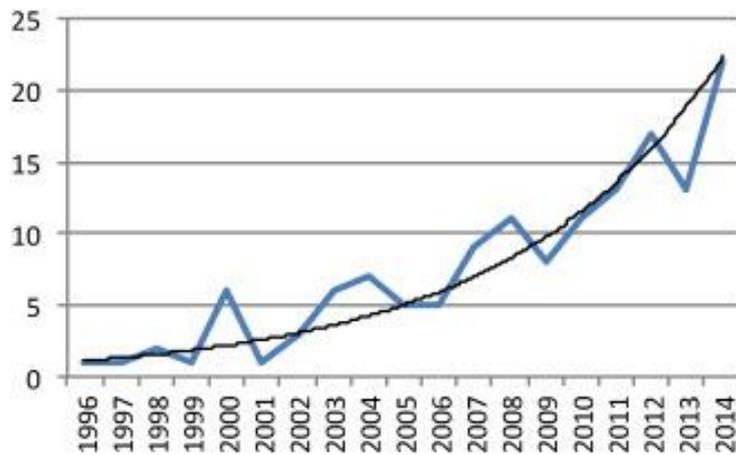
Figure 1.1: Evidence of growth in Coopetition Research.

Source: Bengtsson and Raza-Ullah, (2016 p. 25)

Despite the growth in coopetition studies, several authors agree that there are still many gaps in the understanding of the strategy (Le Roy et., 2016; Devece, 2019). So far, coopetition studies have focused on defining, redefining, understanding its nature, motives, outcomes and processes of the strategy (Padula and Dagnino, 2007; Bengtsson and Kock 2010; Bengtsson et al., 2010; Bengtsson and Kock, 2016). Since the subject area is approaching maturity (Bengtsson et al., 2016), the need to ask more questions mainly in the areas of theoretical development and industrial application of the construct is crucial (Le Roy et., 2016). For instance, Nemeh (2017), stresses the importance of investigating how coopetition emerges within a network of collaborating organisations to identify if the strategy is existing unintentionally.

Studies have established that as a result of the complex nature of coopetition, the strategy may not always occur as an intentional pre-planned decision, as it can materialise unintentionally, taking up a tactical and implicit form (Mariani, 2007; 2009; Walley, 2007; Rusko, 2008; 2015; 2018; Kylanen and Rusko, 2011; Chim-Miki, and Batista-Canino, 2017). However, most coopetition studies focus on the strategy occurring as an explicit and strategic decision. Therefore, there is a need to expand the knowledge of coopetition beyond its intentional occurrence and investigate the factors that can ensure the success of coopetition regardless of its means of formation.

An area of coopetition that has undergone rigorous investigation is how to balance its juxtaposing elements, which authors describe as a "double-edged sword" (Das and Teng 2000; Bouncken and Kraus, 2013; Bengtsson and Kock, 2014; Ritala et al. 2016; Bouncken et al.

2018). Past studies reveal that coopetition is a dynamic interaction that exists on a varying degree of interactions between the collaborative and competitive elements (Luo, 2005; 2007; Bengtsson et al. 2010; Park et al., 2014). The studies show that coopetition interactions may either be collaboration or competition dominated or balanced, depending on the level of collaborative and competitive activities in the relationship (Rusko, 2011; Tidström, 2014; Park et al., 2014; McCarthy, 2018).

Regardless of the nature of the coopetition interaction, tensions resulting from balancing the competition and collaborative elements exist in the relationship. Feng et al., (2011), argues that in a coopetitive alliance, the tensions and its management is one of the factors that determine the outcome of the relationship. Bengtsson et al. (2015), adds that the method of control adopted in guiding the coopetitive relationship can also influence the outcome of the alliance.

However, there is still limited studies reviewing the effects of the control methods and the success of a coopetition relationship. Therefore, it is vital to advance the understanding of coopetition by investigating how the control system in place affects the outcome of the relationship.

There is currently an ongoing debate in coopetition studies, about the most effective and practical management of a coopetitive relationship. While some authors demonstrate that the contradictory elements of the alliance should be structurally separated to reduce the conflicts and tensions (Fernandez et al., 2014), others advocate for a synergy between the opposing perspectives; adding that the focus of coopetition is on the coexistence of the two constructs (Wilhelm and Sydow, 2018). From a practical viewpoint, Le Roy and Fernandaz (2015), report that the integrative method of management would be too problematic to implement, especially if smaller organisations are involved in the alliance. This study seeks to contribute to this debate by investigating the practicality of the two forms of management and how it affects the outcome of both intentional and unintentional coopetition.

Even though coopetition has also received growing attention within the supply chain (SC) literature, Le Roy et al. (2016), believes there are still several opportunities to broaden the understanding of the strategy within the field. Kovacs and Spens (2013 p.1) demonstrated that the study of coopetition within the supply chain field is experiencing significant growth as the number of articles on the subject area increased by 73% between 2011 and 2013. Coopetition studies in supply chain literature have established that coopetition can exist within both supplier-supplier (Bouncken et al. 2015; Depeyre et al., 2018; Durach et al., 2019) and buyer-

supplier relationships (Gurnani et al., 2007; Eriksson, 2008; Lacoste, 2012; Wihlem, 2018). Additionally, studies have shown that coopetition can occur outside an organisation's SC network (Kwok et al., 2015; Wihlem, 2011; 2018).

Additionally, several authors have investigated the effects of coopetition on supply chains, for instance, Wood (2012), studied the impact of coopetition on the SC in the horticulture industry and found that coopetition broadened the supply base of the industry. Pathak et al., (2014), found that coopetition is an essential strategy for improving the overall SC performance, including the value creation, improved corporate performance and customer experience. Ritala (2018), argues that the coopetition strategy is vital in improving the competitiveness of an industry. An important aspect within the application of coopetition in SCs is its impact on the flexibility of the SC. Yu-Ying et al. (2013) argue that coopetition can improve supply chain flexibility (SCF), as it provides organisations with the opportunity to improve their capabilities by leveraging on other organisations' resources. They also reveal that coopetition increases organisations capacity to respond effectively to changes or disruptions in their SC.

While the effects of coopetition on SC is known, it is not clear how the flexibility of a SC can impact on the outcome of a coopetition alliance. For example, does an organisation's ability to handle the various challenges that occur within its SC, influence the outcome of coopetition. In a study conducted by Yu et al., (2017), they conclude that supply chain flexibility improves and strengthens inter-organisational ties, thus leading to successful IORs. It is, therefore, worthwhile to investigate the effects of supply chain flexibility on coopetition performance.

The application of coopetition in various industries has also received some attention in coopetition studies. An example is the automobile industry. Segrestin (2005), found that organisations in the automobile industry adopt similar manufacturing techniques and facilities to produce cars. Hence, competing organisations can collaborate by sharing resources and risks, which reduced the individual manufacturing risks to the firm. For instance, in 1991, Ford and Volkswagen entered a coopetitive arrangement, to produce and sell Volkswagen Sharan, Ford Galaxy and Seat/VW Alhambra (Park and Ungson, 2001). Although the organisations compete to sell the cars in the marketplace, there was value gained from sharing technological and design expertise, as well as cost, which resulted in the reduction in production cost and subsequently, the purchasing price for the consumers. There is also evidence from coopetition between Blu-Ray and HD-DVD, collaborating to ensure that they obtain the larger market share in the high-definition laser-disc technology sector (Gnyawali et al. 2008). Another

notable example is in the IT industry where Sony and Samsung collaborated to develop LCD technologies to compete against other smaller electronic manufactures (Gnyawali and Park, 2011).

As demonstrated above, the application of the coopetitive strategy can be beneficial to organisations and industries (Bouncken et al., 2014), primarily through sharing resources and risks to provide the capability for innovation (Ritala, 2012). However, there are only limited studies on the effects of coopetition on the oil and gas industry (OGI).

The current state of the OGI, plagued with dwindling resources particularly in mature basins such as the UK continental shelf (UKCS), the economic unrest in the nation because of Brexit, legal and safety concerns, coupled with the recent COVID-19 pandemic has necessitated the need for optimised productivity (Davey, 2013; Oil and Gas UK, 2016; OGUK, 2020). In a state-of-the-art review of the UK OGI, Wood (2014), suggests that collaboration among the principal operators in the industry can help maximise the recovery in the UKCS.

Notably, the issue of promoting cooperation in the oil and gas industry is not new (Oil and Gas UK, 2014; 2015; 2016; 2017), with the UK government and OG regulatory bodies even offering incentives to organisations willing to engage in a collaborative alliance (Deloitte, 2017; McKinsey, 2018; Oil and Gas UK, 2018). A survey of collaboration in the UKCS Upstream by Deliotte (2017), reveals that the rate of successful collaboration in the sector increased by 43% (Figure 1.2).

Notwithstanding, the industry still seems to be struggling, particularly with regards to minimising costs to retain competitive advantage, improving performances and productivity (Oil and Gas UK, 2017; 2018). Going by the evidence of successful coopetition in other industries, the coopetition strategy may be a more suitable solution for addressing the challenges in the OGI. Therefore, it is crucial to investigate if coopetition can offer advantages in the oil and gas industry (OGI), specifically to improve and optimise production in the industry.

Less than 50% More than 50% Don't know/not sure

2015 n=55 respondents; 2016 n=101 respondents; 2017 n=121
Source: Deloitte analysis
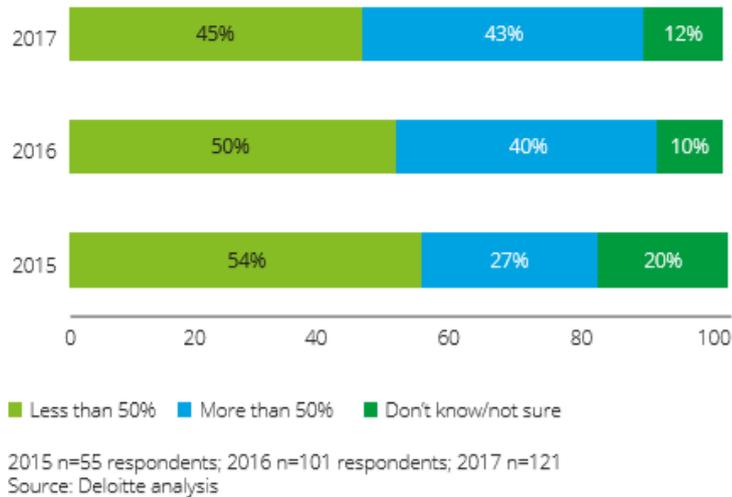
Figure 1.2: Proportion of successful collaboration in UKCS

Consequently, Hokroh (2014), argues that the oil and gas industry is a highly competitive environment. It is essential to investigate the collaborative interactions in the industry for any evidence of coopetition. Since there is a presence of both competitive and collaborative elements in the industry, there may be instances of unintentional coopetition. Additionally, it is critical to study the benefits of coopetition to the OGI. Hence, this study would examine the extent to which coopetition can exist in a collaborative endeavour.

This chapter provides an overview of the research. It discusses the research background and motivation and introduces the initial research questions, including the aim and objectives of the study. Additionally, the scope, assumptions, relevant theories and concepts for the study are discussed, including the research design.

1.2 RESEARCH BACKGROUND

The OGI is a volatile industry, which is extremely sensitive to both external and internal factors within its business environment. Any changes within the business environment can tremendously impact on crude oil prices, consequently affecting the performance of the sector (PwC, 2020; Shearman and Sterling, 2020; Oil and Gas UK, 2020). In fact, the current COVID-19 pandemic caused the industry to experience its third major price collapse in twelve years (Barbosa et al., 2020). While reviewing the current state of the OGI, Chopra (2020), notes that the industry is currently in the midst of a two-prong crisis - a price war between OPEC and

Russia, affecting production (i.e. supply); and the impact of COVID-19 pandemic, affecting the demand for crude oil (Qin et al. 2020). Besides, Gil-Alana and Monge (2020) found that the COVID-19 outbreak made the oil market inefficient, and, in turn, oil prices challenging to forecast.

An analysis of the industry's response to the COVID-19 pandemic reveals that organisations are having to cut down on capital and operational expenditure (Accenture, 2020; Chopra, 2020).

As a result, inefficient and highly leveraged companies may face liquidity crises with some organisations forced out of business. Evidence of this can be seen in BP and Shell's announcement to cut down about 19000 jobs within the UK (Thomas, 2020). Chopra (2020), notes that this job loss may put organisations at a disadvantage, with regards to the shortage of skilled labour when the market rebounds.

Thus, governing bodies and industry experts are encouraging organisations to improve their business resilience to remain productive even in periods of uncertainties.

In addition to the current covid-19 crisis, the OGI was only beginning to recover from the 2015 crash in crude oil prices. the oil and gas industry experienced a severe crisis resulting from the dramatic plummet in oil prices with the price of crude oil falling by 75% between mid-2014 and November 2015 (Wingfield, 2017). The price drop resulted in a reduction in the UKCS production rate, thereby increasing the cost of operations for oil and gas companies (UK Economic Outlook, 2015; Husain et al., 2015; Oil and Gas UK, 2016). Consequently, to survive the harsh realities, oil and gas companies (OGC) re-evaluated their strategic positioning by engaging in more collaborative endeavours, to reduce the cost of production (Oil and Gas UK, 2016).

In addition to the drop in crude oil prices, the UK voted to leave the European Union (EU) following a 2016 referendum, introducing some agitation about the UK economy Post-Brexit (Oil and Gas Authority, 2016; 2017; 2019; Oil and Gas UK, 2017; 2019). The Brexit has introduced political and economic insecurity to the OGI, as it increases the complexities in the industry, especially considering the challenging business environment the industry is facing (Oil and Gas UK, 2017). Although the UK government reassures the OGIs that Brexit would only cause minimal disruptions since the country has control over its energy policies and oil and gas reserves (Oil and Gas Authority, 2018), it would affect long-term investment decisions for the sector (Oil and Gas UK, 2018; 2019). Brexit would cause significant distractions from

managing the current industry downturn and reduce the influence the UKCS has on the surrounding oil and gas producing region (de Leeuw, 2017). Oil and Gas UK (2017 p. 6) forecasted that owing to the uncertainty caused by Brexit, the cost of trade for the UK oil and gas industry could increase by £500 million per annum. Consequently, this political and economic instability would be a source of uncertainty in the industry.

Even though the UKCS has one of the most mature offshore basins in the world, it still harbours many potentials for production (Oil and Gas UK, 2016). Unfortunately, Wood (2014) discovered that there is an abrupt decline in production efficiency due to the maturity of the basin. This decline in production and the effective management of ageing plants have become a source of challenge for both operators and regulators in the oil and gas industry (Oil and Gas UK, 2016).

Organisations strive for strategic optimisation of their supply chain operations both within its internal and external business environment to accommodate the fast-paced business and economic realities (Phillips and Moutinho, 2018). Similarly, for the UK OGI, to cope with the fast-changing business environment, resulting from the political and economic instabilities, they need to optimise their supply chain. The maturity of the North Sea suggests that the OGCs need to operate in a hostile environment to compete for the limited resources to remain productive, which may explain the fierce competitive rivalry within the oil and gas industry (Oil and Gas UK, 2016). Adopting a strictly competitive strategy can adversely affect the optimisation of resources within the industry, which may affect the rate of production and performance in the sector.

Consequently, one of the critical objectives of the UK OGI is to optimise the limited resources in the region. According to the review by Wood (2014), active collaboration among the major operators in the industry can be beneficial in meeting this objective. However, Wood (2014), noticed that there is a negative attitude towards collaboration in the industry, stating that operators prefer stranding organisational assets than collaborating amongst themselves. Hokroh (2014), reiterates that the intense rivalry in the industry prevents organisations from engaging in collaboration, impacts significantly on the productivity of the sector. It may be worthwhile for the industry to consider other strategies to address these issues.

Therefore, it becomes critical to investigate the suitability of the coopetition strategy to provide benefits to the OGI, mainly in addressing the challenges in the industry. Since OG operators are unwilling to collaborate as a result of the industry rivalry, perhaps, a strategy that embraces

both elements may be more suitable. Effective supply chain collaboration can occur vertically among organisations within the same supply chain network (Salam, 2017), or horizontally between organisations not in direct competition (Chen et al. 2017). While collaboration among organisations in the oil and gas industry should be encouraged, it has over time proven to be a challenging endeavour because of its competitive environment. In fact, the OGI regulatory bodies offered incentives to organisations willing to engage in any collaborative relationships (Oil and Gas UK, 2016; 2018). Therefore, an important question to ask is; is coopetition, a more natural strategy to adopt in optimising production in the oil and gas industry?

As introduced above, coopetition is a hybrid of two opposing traditional inter-organisation theories: competition and collaboration. While the collaborative perspective is grounded in convergent goals, the competitive aspect relies on divergent interests (Brandenburger and Nalebuff, 2000; Bouncken et al., 2015). From the competitive perspective, because every organisation aims to outperform its rivals, it relies on hostility, rivalry and conflicts which can constrain innovation and access to new opportunities (Lacomba et al., 2011). Whereas collaboration strives to achieve common goals by collective actions, so it is based on sharing information, knowledge, resources and risks, which is enabled by trust, commitment and reciprocity (Thomson, Perry and Miller 2009; Bouncken et al., 2015). Although it has been argued that these traditional theories are limited as they fail to depict the realities of inter-dependencies amongst organisations (Bouncken et al., 2015). Within collaboration studies, competition is described as a negative influence, owing to the several associated risks such as opportunism (Ritala, 2018).

Since the conceptualisation of coopetition by Brandenburger and Nalebuff (1996), studies have investigated the benefits of the strategy (Bouncken, 2015). It has become common knowledge in the coopetition community that the strategy is useful to help gain market power, improve innovation processes, and if well managed, improve competitive standing (Luo, 2007; Chen, 2008; Bengtsson and Kock, 2014; Ritala, 2018). Regarding the use of the coopetitive strategy to gain market power, Bengtsson et al., (2016), reasons that in coopetition, organisations collaborate to create a larger market and then compete to control the most substantial portion of this newly created market. Thus, implying that organisations aim to get the most prominent market power to the detriment of other market players. Examples of these dynamics is seen in several producing companies like Toyota, Peugeot and Citroen jointly designing and manufacturing a car, then competing to market the cars under different names with minor modifications (Gnyawali and Park, 2011) and within service companies such as the Amazon

business model that allows competitors use their platform to reach similar consumers (Ritala et al., 2009). This dynamic lead Rusko (2011) and Liu (2013) to conclude that the significant motives for coopetition are; to attain a broader market and add value to the organisations involved. Evidence of this theory can be observed in the smart card industry, where organisations commonly cooperate in input activities such as R&D, design implementation and compete to get the largest share of the value jointly created (output activities) like cost reduction and characteristics of use (Bouncken et al., 2015). Therefore, Bouncken et al., (2015), concludes that for coopetition to be used to gain market power, the collaborative endeavours need to occur as far away from the end-users as possible to avoid opportunism. Although, this may not always be the case or possible in some industries, especially since the nature of operations are different in various industries, for instance, the oil and gas industry where there is not a clear divide between the end-users and the operators.

Additionally, coopetition is an effective strategy in responding to environmental threats and opportunities. With regards to changes in the business environment Ritala (2018), noticed that a changing and unstable business environment affects the coopetitive strategic behaviour of an organisation. For instance, Ritala (2012) observed a positive connection between coopetition and the innovation and market performance of organisations in general and particularly in the event of high uncertainties, positive network externalities, and low competition in the market. Besides, Mariani (2007; 2018), revealed that coopetition could emerge when lawmakers impose collaboration on organisations for institutional benefits — therefore suggesting that the external environment of an organisation can push it to engage in coopetition.

As described above, since the lawmakers and regulatory bodies in the UK OGI, encourage collaboration, it is worthwhile to investigate the existence of coopetition within the sector. Due to the uncertainty in the industry, operators have been encouraged to collaborate (Wood, 2014). Studies within the OGI, show that there are several opportunities for collaborations within the industry, and several collaborative trends have emerged (Oil and Gas, UK, 2016; Delliote, 2016). For example, 78% of operators and 82% of suppliers believe there is either a strong need to collaborate to improve the economics of decommissioning (OGUK, 2017). Similarly, Dellitte (2019), notes that a streamlined contract and procurement processes between operators and suppliers can reduce time wastage in the OG operations. Delliote (2019), also finds that cost reduction and knowledge sharing are among the key drivers of collaboration within the industry. Thus, OG governing bodies actively encourage organisations to collaborate. In fact, there are many pieces of evidence of government in oil-producing countries actively

encouraging the operators to collaborate, for instance in Norway, the state-crafted JOA (Joint Ownership Agreement) is mandatory and stipulates a duty of care by non-operators that gives them a full liability in the venture. The JOA is agreements between the state or its designated authority and companies, to allow a National Oil Company, to participate in a JV. The rationale for the host state is to be involved in decision making and benefit from the technical expertise of the International Oil Companies. Furthermore, the Ministry and the NPD (Norwegian Petroleum Directorate) have used their powers to force the operators in the industry to collaborate. For example, Luno and Draupne were instructed to explore a joint development to exploit synergies (Thorton, 2016).

Despite the benefits of forced collaboration, Lynn (2017) points out that forcing operators can be counterproductive, especially since a collaborative endeavour requires proper planning to identify partner selection, governance structure, charter, and scope to attain mutual benefits, which can be overlooked if organisations are forced to collaborate. Consequently, it is crucial to investigate what factors would ensure success in both forms of coopetitive endeavour (intentional or unintentional), which may occur if the industry force organisations into collaborative alliances. At this point, it becomes useful to investigate if coopetition exists in the OGI, whether as a deliberate or emergent strategy. Reviewing its formation is especially important since the oil and gas industry is highly competitive, suggesting that there may be instances of unintentional coopetition in collaborative relationships.

Scholars have suggested that overcoming knowledge lop-sidedness with regards to innovation is one of the critical benefits of coopetition (Brolos, 2009; Ritala et al., 2016). The likelihood of competitors having similar or joint knowledge base than non-competitors is relatively high; therefore, sharing knowledge supports new knowledge and product creation (Ritala and Hurmelinna-Laukkanen 2009; Bouncken et al., 2018). Besides, competitors encounter similar market environment, customers, and relatable uncertainties which in-turn creates a chance for a mutual insight of proposed changes and hence inspires the development of innovations that would be of advantage to all parties involved (Baumard, 2009; Ritala, 2016).

Consequently, in comparison to alliance, integration or collaboration with non-competitors among the market players, coopetition necessitates vital benefits for innovation activities (Bouncken et al., 2015). Coopetition studies show that adopting the strategy can improve the rate of innovation in the organisations (Gast et al. 2015). Similarly, drawing from the Prisoner's Dilemma of Game Theory, Rodrigues et al. (2009), proves that the expected outcome of

coopetition is a win-win situation for the parties involved. An example is of this outcome is the alliance between Apple and Nike. Both organisations experienced a significant increase in international brand recognition, market shares, sales and market penetration as a result of innovation made possible by coopetition (Rodrigues et al. 2009). Likewise, Bouncken and Fredrich (2012) observed that there is a progressive relationship between coopetition and the organisations' entire competitive performance and their success in developing innovations. Therefore, it has been postulated that the critical effect of collaboration with competitors is the development of more radical innovation, especially when compared to collaborating with non-competitors (Roig-Tierno et al., 2018).

Despite the appealing benefits of coopetition, the nature of the strategy which involves combing two opposing constructs subjects the alliance to several risks, especially with regards to innovative activities (Cygler et al., 2018). Unintentional knowledge leakage, opportunism and asymmetric of benefits and resources are some of the risks that can arise as a result of the coopetition (Bouncken et al., 2015; Cygler et al., 2018). Hence, to ensure beneficial coopetition, it is crucial to address the tensions in the relationship as well as their causes (Jakobsen, 2019).

Notably, some studies have attempted to investigate solutions to addressing and managing the coopetition tensions. For example, Bengtsson and Kock (2000), encourages balancing the degree of friendliness and hostility as the relationship progresses. They add that failing to attain this balance may result in the build-up of tension in the coopetition alliance. Levy et al. (2003), proposes the use of a dynamic management team to define and monitor the boundaries in the relationship. Bouncken et al., (2015), opines that viewing coopetition partners as both rivals and friends would help organisations determine the nature and extent of information shared among the parties in the alliance. Additionally, Vanyushyn et al., (2018), suggests that coopetition activities should be limited to a specific non-core function of the organisation, where there is be a balance between the sharing and withholding of critical knowledge.

As discussed above, even though several authors have proposed practical tension management techniques, two methods of tension management which involves either separating or integrating the paradoxical elements of the constructs have been subjected to rigorous debate in the coopetition community (Bengtsson and Kock, 2014; Fernandez et al., 2014, Raza-Ullah et al., 2014; Tidström, 2014; Bengtsson and Raza-Ullah, 2046; Fernandez and Chiambaretto; 2016; Pellegrin-Boucher et al., 2018; Le Roy et al., 2018). Coopetition scholars consistent with

the separation principle of tension management argue that simultaneous collaboration and competition between individuals is impossible, the elements of the interactions should be separated (Bengtsson & Kock, 2000; Herzog, 2010; Bengtsson and Kock, 2014; Pellegrin-Boucher et al., 2018). Whereas, some authors argue that adopting a separation principle creates internal tensions within the organisations in coopetition, especially on an individual level (Das & Teng, 2000; Chen, 2008). Therefore, to avoid introducing additional tensions in the alliance, the integration principle, which refers to a cognitive acceptance of the paradox, is encouraged (Lewis, 2000; Smith & Lewis, 2011). The integration principle involves the parties' ability to understand each others roles and expectations and fit the coopetition duality into their daily activities (Pellegrin-Boucher et al., 2013; Fernandez et al., 2014; Pellegrin-Boucher et al., 2018).

Although, there is no consensus about the most effective method of managing coopetition — either through separation or integration of the paradoxical elements of the constructs (Wilhelm and Sydow, 2018). Studies have identified additional methods to ensure a successful coopetition alliance. For example, Hiesse et al. (2011), posits that the use of a neutral third party to manage the cooperative phase of a coopetition relationship is a more practical way of managing the tensions in the relationship. Bouncken et al., (2015), suggests that it is essential to have formal protection mechanisms in place when managing coopetition to enable organisations to integrate and share necessary knowledge while also avoiding the leakage of vital information and core competencies. With the several means of managing coopetition, it is vital to investigate the most efficient manner of managing coopetition tensions in the OGI, as well as review the effects of tension management on the outcome of coopetition.

Furthermore, several studies have shown that organisations that have a dedicated alliance function have an increased chance of attaining successful IORs. For instance, Liu and Ravichandran (2011), sums that the existence of a dedicated alliance function indicates a strong alliance capability of an organisation which leads to more successful alliances as the organisations can learn from past relationships and translate the lessons to current IORs. Similarly, studies have established that organisations that manage their alliances through a dedicated alliance function have an increased chance (about 70%) of achieving successful IORs (Dyer et al. 2001; Kale et al. 2002; Kale et al. 2009; Lavie, 2016). As such, it is crucial to examine if the presence of a dedicated alliance function improves the chances of coopetition success.

Even though the study of coopetition is increasing in the SC subject area (Klein et al. 2007; Gurnani et al. 2007; Bakshi and Kleindorer, 2009; Wilhelm 2011; 2018), there are still some noticeable gaps in knowledge. Many studies of coopetition in SCs address its effects on the SC performance (Rai et al., 2006; Fayazbakhsh et al., 2011), the positioning of the alliance (Klein et al. 2007; Rusko, 2011), SC resilence (Bakshi and Kleindorer, 2009; Ali et al., 2017) the effective management (Wilem 2011; 2018). However, there is a lack of studies reviewing the effects of supply chain capabilities on the outcome of coopetition. Although, some studies have shown that having a flexible supply chain strengthens inter-organisational (IO) ties, which positively influences the outcome of IORs (Martínez Sánchez and Pérez Pérez, 2005; Wang and Wei, 2007; Prakash and Deshmukh, 2010; Brinkhoff et al., 2015; Fayezi et al., 2017). However, it is not clear if a similar outcome is obtainable in a coopetitive alliance, which therefore warrants an investigation.

Furthermore, literature has highlighted the benefits of successful coopetition to an organisation and a supply chain, however, there is an evident lack of research materials that can act as a guide to parties willing to take part in the coopetitive endeavour. As the coopetition management concept is still emerging, lack of guidance can hinder willing participants from venturing into the relationship. Although Vangen and Huxham, (2009), discussed the critical themes and guides to attain collaborative advantages, and Wolffe (2016), developed a coopetition implementation framework, additional studies need to be undertaken to extend the frameworks beyond the collaborative elements of the alliance, especially regarding the management of coopetition. For instance, when does competition begin in a coopetitive relationship?

Moreover, understanding how coopetition works, particularly in light of the upsetting news arising from the oil and gas business environment, proper understanding and application of coopetition to their supply chain, in line with the highlighted benefits of coopetition (Brandenburger and Nalebuff, 1996; Ritala et al. 2016) would be beneficial to optimising production.

Methodologically, most of the existing coopetition studies adopt a qualitative approach to make sense of the complex nature of the construct, particularly with the use of single and multiple case studies (Bouncken et al. 2015; Devece et al., 2019). Additionally, there are a few quantitative studies utilising game theory modelling and regression modelling to investigate

the coopetition concept, with even fewer studies combining both methods. This study combines both qualitative and quantitative methodologies to investigate the coopetition strategy.

This research progresses the body of knowledge by creating a guideline for successful coopetition, through a holistic study of its nature, behaviour, tensions, management, especially within SCNs. It would study the occurrence of coopetition within the oil and gas industry and provide an industry framework for effective coopetition.

1.3 RESEARH GAP

The current crisis in the OGI, resulting from economic and political uncertainty as well as the maturity of the oil field, suggests that collaboration may provide benefits in improving the productivity of the industry (Wood, 2014). However, given the rivalry in the industry, it can be assumed that coopetition may provide significant advantages in optimising production in the oil sector. Going by Mariani (2007)'s stance, because of the external environmental factors in the industry, coopetition may already exist unintentionally within the sector, particularly among organisations in collaborative alliances. Notably, there seems to be limited research addressing the formation, and antecedents and structure of emergent coopetition. This paucity of research represents a knowledge gap, addressed in this thesis by reviewing and investigating emergent coopetition in the UK OGI. The conclusions from the study would be beneficial for organisations, serving as a guide to successful coopetition, even if it occurs unintentionally. This study, therefore, addresses the following problems in coopetition studies.

The first gap in literature this study addresses is the lack of a systematic review of the existing conceptual and empirical studies of coopetition, to set a foundation for reviewing the effects of coopetition on organisational performance. The coopetition phenomenon has been studied in management and strategy literature since its conceptualisation in the late 1990s/early 2000s (Brandenburger and Nalebuff, 1998; Bengtsson and Kock, 2000). Following its conceptualisation, the concept has steadily gained popularity with several studies discussing the concept along with its related implications. Notably, several systematic reviews of coopetition have been conducted to help provide a foundation for the progression of the study area, for instance, (Bengtsson & Kock, 2014; Czakon et al., 2014; Bouncken, 2015; Bouncken et al., 2015; Dorn et al., 2016). Nonetheless, these reviews provided a general overview of coopetition and did not focus explicitly on any of the implications of coopetition, for example,

the management of the strategy resulting from its inherent tensions, its implication on organisational performance was not systematically investigated. An extensive coopetition literature review would have been beneficial to set the scene for the application of coopetition in the OGI to improve efficiency and productivity in the OGI operations. Hence, a systematic review of coopetition, which highlights its application as a strategy to improve organisational performance is necessary.

Secondly, the study of coopetition as an emergent strategy needs to progress in management and strategy studies. Since the conceptualisation of coopetition, only a few studies have focused on coopetition that occurs unintentionally. Most studies investigating coopetition as an unintentional strategy, focus primarily on its formation. For example, Mariani, (2007), focuses on the role of external factors in the formation of emergent coopetition, Czakon (2010), studies the emergence of coopetition within cooperative alliances. Kylänen and Rusko (2011), investigates the formation of unintentional coopetition between private and public sectors in the tourism industry. Tidström and Rajala (2016), adopts a strategy-as-practice methodology and lifecycle model to provide evidence regarding the formation of emergent coopetition in practice. Dahl et al., (2016), reviews the formation and implementation of coopetition both as a deliberate and emergent strategy, on an intra-organisational level. Despite these studies, the structure, management, success factors, antecedents and outcomes of emergent coopetition remains unclear. There are several questions which need to be addressed, regarding the implementation and management of unintentional coopetition, for instance, are the antecedents for deliberate coopetition, applicable when the strategy is unplanned? Although studies have established that coopetition can occur unintentionally even within the OGI, there are many questions about its antecedents, management, governance, success factors that need to be uncovered. Understanding the nature of the unintended coopetition may be helpful to improve the collaborative index in OGI. Therefore, it is crucial to advance the expand the knowledge of coopetition by reviewing what governance and management structures are vital to ensure the success of emergent coopetition.

Another crucial area that requires further investigation is the issue of governance in coopetitive relationships. Even though the issue of governance has been discussed in the literature, with several studies first attempting to understand the dynamics of coopetition and then investigate the mechanisms to govern the strategy (Bouncken et al., 2016). Interestingly, Devece et al., (2017), groups the governance mechanisms into two; the *transactional governance* which covers legal agreements, economic incentives to guide coopetitive interactions and relational

governance, which deals with commitment, trust, mutual understanding in alliances. A study by Hung and Chang (2012), shows that organisations in coopetitive alliances decide on the mode of governance based on the volatility of the industry. The study, reviewing the governance model in the technology industry, found that transactional governance is preferred when the alliance occurs between direct or protentional competitors. Whereas, when the alliance occurs in technologically advanced industries, relational governance is applied.

Interestingly, factors in relational governance is viewed in coopetition literature as both a control mechanism to guide the relationship (Kale, 2000; Osarenkhoe, 2010; Wolff, 2016), as well as a critical antecedent for a successful coopetition alliance (Chin et al., 2008; Petter et al., 2014; Ceptureanu et al., 2019). Despite the attention that has been given to the role of relational governance in coopetition literature, there are limited studies investigating how transactional governance affects coopetition alliances. More importantly, studies in coopetition view the two governance mechanisms as substitutes (Brolos, 2009; Osarenkhoe, 2010; Hung and Chang, 2012; Gnywali and Park, 2014), with little considerations about viewing them as complementary. Some studies suggest that the presence of formal control can remove trust from a relationship and therefore increase the tensions since trust is expected to precede the relationship and eliminate the need for contractual agreement (Wollthius et al., 2002; Chen et al., 2008; Nielsen 2011). On the other hand, scholars in the Transactional Cost Economy (TCE) school of thought argue that contracts form the basis for trust, as it limits the chances and incentives for opportunism, which then provides a trusting environment for the parties involved as breaching a contractual agreement will be at the cost of sanctions (Williamson, 1975; 1985; 1993; Mellewigt et al., 2007; Bouncken et al., 2016). To advance the knowledge of coopetition, this study investigates the role of relational and transactional governance in coopetitive relationships and how it influences the performance of both emergent and deliberate coopetition. It also considers the effect of adopting the governance mechanisms in a complementary manner on the outcome of coopetition.

Notably, some of the barriers to successful collaboration in the OGI, as identified by Delliote (2019) include misaligned expectations, asymmetric collaboration benefits, lack of trust, power imbalance, problematic partners, and inexplicit contracts. The issues barriers listed above can be resolved through adequate and effective management and governance of the IOR. Thus, it is essential to investigate the most effective governance and management technique for each form of coopetition.

Another area lacking extensive studies is the study of coopetition from a supply chain viewpoint. Studies of coopetition from a supply chain perspective revolve around comparing the distinct characteristics and behaviours of coopetition, collaboration and competition among the supply chain partners (Wilhelm, 2011; Klimas 2014; Wolff, 2016). Therefore, suggesting that there are vast opportunities to expand the study of coopetition from a supply chain viewpoint, as several questions remain unanswered. These gaps form a basis for this study, as one of its objectives is to review the extent to which coopetition can exist, not only between focal supply chains but also among members of the supply chain. For instance, can a focal organisation encourage coopetition among its suppliers and what would be the effect on the focal organisation? This study, unlike most coopetition studies within the supply chain field, is concerned with understanding how coopetition works and then providing a practical guideline for parties interested in engaging in such relationships. Thus, it goes beyond merely investigating the nature of the coopetition but also studies how the relationship can emerge unintentionally, particularly within supply chains.

Additionally, while studies have shown the extent to which coopetition can affect SC performance, e.g. by improving its capabilities (Morris, Kozak & Özer, 2007), reducing the bullwhip effects (Lee, 2002), reducing costs and risks in a SC (Li et al., 2012), increasing SC resilience (Bakshi and Kleindorfer, 2009; Kovacs and Spens, 2013), and increasing the flexibility of the SC (Kwok and Lee, 2015). It is unclear how SC issues can affect the performance of coopetition. For example, how does the flexibility or SC strategy of an organisation affect the outcome of coopetition? Therefore, this study would explore how the flexibility of a SC can affect or influence the performance of coopetition.

Furthermore, with regards to the application of coopetition in industries, there have been only a few studies of coopetition in the oil and gas industry (e.g. Kalanda (2016), studied the pre-requisites and outcomes of coopetition in international oil companies, Ceptureanu et al., (2019) focuses on the coopetition success factors among oil and gas distribution networks). Even though, Czakon et al., (2015), found that most coopetition studies in industries are within industries characterised by rapid technology changes, involving complex products, high competition and has a high rate of uncertainty, which are all characteristics of the oil and gas sector, surprisingly, there is a low rate of investigation in the industry. However, Czakon et al., (2015), equally discovered that coopetition literature has failed to investigate more established industries, which may explain the lack of research in this area. Therefore, this study would broaden the coopetition study by examining the effects of coopetition in the oil and gas sector,

investigating the extent to which coopetition already occurs in the industry both deliberately and as an emergent strategy. Mainly, this study uses the UK Oil and Gas sector as a case study to improve coopetition performance.

Another gap that is noticeable within the coopetition studies is regarding its manner of investigation. Bouncken et al., (2015) points out that most of the coopetition studies are exploratory with about 56% of studies adopting a primarily qualitative approach and only 5% using mixed-method research. It is not surprising that most coopetition studies are exploratory as the concept is yet to reach maturity, with scholars still attempting to understand the phenomena in its entirety (Bengtsson and Kock, 2014), and exploratory studies are advantageous in investigating new concepts (Creswell, 2003). However, to understand the coopetition concept more holistically, other approaches should be employed, for instance, explanatory methods are vital in drawing more unambiguous conclusions than its exploratory counterpart (Creswell et al., 2003). Thus, other research approaches should be employed in coopetition studies; in fact, Czakon and Rogalski (2014), suggests that the concept should be investigated using an explanatory or descriptive approach. Devece et al., (2017), advocates the use of mixed methods and case studies, to provide insight into the coopetition dynamics and to test the validity of the assertions. Hence, this study adopts a mixed approach to investigate coopetition. In the first instance, exploratory research is conducted by exploring the occurrence, antecedents and success of coopetition, both as a deliberate and emergent strategy in the oil and gas industry. Subsequently, based on the outcome of the exploratory qualitative study, quantitative research is conducted to attempt to explain the reasoning behind the factors uncovered in the exploratory analysis.

1.4 RESEARCH PROBLEM STATEMENT

The research gaps discussed in the previous section have led to the identification of two crucial aspects within the coopetition field that requires further studies, to expand existing literature, and improve the outcome of coopetition practices.

What factors are essential in ensuring successful unintended coopetition, and how does the flexibility of an SC affect its success? This problem definition will develop a better understanding of unintended or forced coopetition. Thus, the purpose of the research is to investigate coopetition alliances within the OGI for evidence of unintended coopetition and

then seek to understand its formation, management and governance. Additionally, investigating the effects of supply chain flexibility on the outcome of a coopetition alliance is helpful in partner selections. This study can subsequently be useful in providing an updated complete framework and guideline for engaging in coopetition relationships.

1.5 SCOPE OF THE RESEARCH

Following the from the Wood Review (2014), which is the motivation for this study, this research focuses on investigating coopetition within the upstream sector of the UK oil and gas industry. Besides, Oil and Gas UK (2018), describes the UK OGI, as having one of the most advanced supply chain operations in the world and the industry has often been described as being the Oil and Gas Capital of Europe (Reed, 2013). Thus, adopting the industry as a case study implies that the results can be replicated or similar across other oil-producing countries.

While the OGI is largely divided into three major segments; the upstream, midstream and downstream, the upstream is perhaps the most complex of all three sectors (Peters and Hood, 2000). The upstream sector of the oil and gas industry is primarily concerned with the search and production of crude oil and natural gas (Weijermars, 2010). This sector of the industry is believed to influence the entire OG supply chain as it controls the amount of crude oil and natural gas that flows through the remaining SC (Brigs et al., 2012). Acha (2000), points out that this sector of the OGI is predominately controlled by a few international OG companies with an extensive global supply base and frequently sharing asset ownership. The primary operations involved in the upstream are exploration, which consists in searching for potential oil fields through seismic, geophysical and geological studies. Production is another upstream operation, and it involves drilling, production, facilities, engineering and reservoir (Brigs et al., 2012). Chima (2007), adds that owing to the high level of similarities of the products being offered (crude oil), organisations cannot differentiate themselves by introducing new products. Thus, the companies focused on this activity need to distinguish themselves on other factors such as efficient, low-cost methods of oil production, and through the adoption of an effective SCM. Yarrow (1991) adds that since this sector requires ample investments as well as sophisticated transportation technologies to respond to its spatial pattern of demand and supply, then there is considerable asset specificity. For instance, pipelines need to be constructed for each production.

The midstream is concerned with the distribution and storage of the raw crude oil. According to Brigs et al., (2012), the midstream sector is not part of the production process as it is not involved in the modification or altering of petroleum products; instead, it deals with the distribution systems such as the pipelines that transport crude oil to either refineries or storage tanks. Hence, the primary activities in the midstream sector are the transportation and storage of crude oil.

The downstream sector of the OGI is the part of the OG SC that has a direct link with the end-users of the petroleum products. This sector involves activities such as the refining, transportation, marketing and distribution of petroleum products (Brigs et al., 2012). The end-users for the petroleum products have been divided into two categories, wholesale (airlines, power plants) and retail customers (domestic uses like heating or transportation) (Chima 2007). It is important to note that this sector of the industry was categorised as the most competitive and developed sector (Brigs et al., 2012). The primary activities in this sector are refining the crude oil to transform it into usable products such as gasoline, jet fuel, and marketing which is the distribution of the end products to the consumers.

Dauda (2008), argues that some of the supply chain challenges plaguing the downstream sector of the OGI are the cost of operations, as operators are continually striving to reduce the cost of extracting the crude oil as well as lowering the long lead time of delivering services by the contractors which can affect the competitiveness of the SC.

Since the upstream sector of the OGI can influence its entire SC, it is worthwhile to adopt this sector as the case study.

1.6 RESEARCH AIMS AND OBJECTIVES

The discussion in the sections above has shown the gaps in coopetition studies. The studies focusing on coopetition that emerges has an unintentional strategy is limited in coopetition literature. Additionally, there is no consensus about the most effective management and governance structure to ensure a successful coopetition alliance, particularly within the oil and gas industry. Moreover, the effects of the supply chain function on the outcome of coopetition are unclear. Therefore, this study seeks to improve the understanding and application of the strategy by exploring the various forms coopetition can occur in organisations and investigate

the practical approach to control and manage the tensions in the relationships, as well as to review the role of SC in ensuring coopetition success.

Hence, this research aims to develop and test a conceptual framework that reviews the effects of management structure, control mechanisms and impacts of supply chain on both intended and unintended coopetition, using the UK Oil and Gas Industry as a case study.

In order to achieve this aim, the following sets of objectives are proposed:

1. To review relevant academic and business literature on inter-organisational relationships and coopetition to clarify the gaps in knowledge.
2. To explore the UK Oil and Gas Industry, to uncover the extent to which coopetition already occurs in the industry, both deliberate and unintended.
3. To investigate the factors that can influence successful coopetition in both intended and unintended coopetition.
4. To develop a conceptual model to identify the similarities/differences between intended and unintended coopetition.
5. To construct quantitative measures to test the framework developed in objective 4, using a structural equation modelling technique to estimate and verify the empirical data.
6. To confirm the relationships between the factors necessary for successful coopetition.
7. To provide theoretical and practical implications based on the study outcome, suggesting appropriate coopetition guidelines, and
8. To suggests recommendations and areas of further research.

1.7 PURPOSE OF THE RESEARCH

The purpose of this study is to contribute to coopetition and SC body of knowledge, by exploring and comparing the formation and structure of the coopetition alliances, as well as investigating the necessary management and governance structure to ensure a successful coopetition endeavour. Additionally, the study explores how the SC strategies of an organisation can influence the adoption and performance of coopetition. These objectives are achieved through a holistic assessment of the UK OGI to understand the opportunities and hindrances of adopting the coopetition strategy to improve productivity in the sector. The study draws from within the field of inter-organisational, supply chain and coopetition studies with

the aid of structural equation modelling technique. In more details, the purposes of this research are in fivefold:

1. To improve the understanding of coopetition strategy, by conducting a holistic review of the literature regarding the various typologies, motivations, levels of coopetition in management literature, in order to identify and clarify the existing knowledge gap.

2. To explore the UK Oil and Gas Industry, to uncover the extent to which coopetition already occurs in the industry. Particularly to investigate the unintended occurrence of coopetition since the industry highly encourages collaboration in the industry, it is expected that there would be instances of unintentional coopetition. It would also review the awareness and perception of the industry to the strategy and uncover potential causes of hesitations in adopting the strategy. Additionally, it would explore the methods of management and control utilised in such relationships.

3. To develop a framework and derive a structural model of attaining success in both deliberate and unintended coopetition, based on the effects of effective management and control techniques, as well as having a flexible supply chain.

4. To construct quantitative measures to measure and test the framework developed in objective 3, using a structural equation modelling technique to estimate and verify the empirical data.

5. Finally, to provide theoretical and practical implications of the study outcome and suggest guideline, recommendation and areas of further research.

1.7.1 RATIONALE

In general, identifying the sources and the management of coopetition tensions have formed the bases of several coopetition studies. The formation, benefits and risks of coopetition alliances are also vital aspects of advancing coopetition studies. Therefore, understanding the formation and management of coopetition as well as the appropriate governing mechanism to ensure the success of a coopetition alliance would provide researchers and practitioners with valuable insights into the necessary factors for coopetition success and reduce the rates of opportunism. Consequently, this study is relevant and timely as it provides new perspective for understanding coopetition success based on the method of the strategy's formation (Mariani, 2007; 2018), the governance mechanism (Hung and Chang, 2012), the tension management (Fernandez and Chiambaretto, 2016; Wilhelm and Sydow, 2018), the role of a dedicated

alliance function (Liu and Ravichandran, 2011), and influence from SC (Qrunfleh and Tarafdar, 2014). Furthermore, as an emerging field in management studies, the study of coopetition has been influenced by frameworks and concepts from the traditional inter-organisational strategies – competition and collaboration. Therefore, a structured coopetition model can be useful to allow coopetition practitioners to understand the formation, antecedents, management and success factors to obtain optimal benefit from the alliance. This factors would allow the potential coopetition manager to identify suitable coopetition partners and also recognise the ideal environment for coopetition to thrive, for example, by separating the elements of the coopetition strategy. Therefore, this study continues and extends the knowledge in the field by investigating if the success factors in engaging in deliberate coopetition are also applicable if the strategy occurs unintentionally.

1.8 RESEARCH APPROACH AND DESIGN

This section introduces the design and approach for the study and is described extensively in Chapter Three. Presenting the research design and plan at this stage is beneficial for the understanding of the overall research. Following a thorough review of methodological paradigms and philosophy, this study adopts a mixed-method design using well-established methodologies and techniques in two primary phases. Given the primarily exploratory nature of the study, a holistic investigation of coopetition was conducted using secondary sources, to uncover relevant themes within the subject area, which led to a concept clarification semi-structured interview to create a better understanding of the themes and their real-life applications. This concept clarification was conducted by interviewing academic experts to ensure an effective theoretical positioning of the study and the practicality of the research's aim and objectives.

Subsequently, a detailed qualitative semi-structured interview was conducted to allow an exploration of the OGI. The semi-structured study targeted oil and gas industry experts within the SC field to explore the awareness, perception, success factors, effective control and management technique of the coopetition. It also uncovered the extent to which coopetition already occurs in the industry, both as a deliberate and emergent strategy based on the nature of the sector. As a result of the qualitative explorations, some hypothesis and a conceptual framework were developed for the study. In order to test the hypothesis, a web-based survey was identified as the most suitable and cost-effective tool for gathering empirical data for the

research. The questionnaire adopted pre-tested measures from existing literature based on their relevance to the study objective with slight modifications and developed new measures in cases where there were no pre-existing measures. The questionnaire was designed using google forms and deployed by directly contacting OG companies in the UK and using LinkedIn to recruit SC professionals in the OGI. The data collected was then subjected to rigorous analysis using descriptive tools and estimation using structural equation modelling. A detailed description of the methodology and approach will be covered in Chapter Three of the thesis.

1.8.1 RESEARCH SETTING

The study was conducted in the UK, with the unit of analysis based on individuals, with pre-defined characteristics, for example, based on the length of work experience within a SC role of the Oil and Gas Industry. The UK is an essential player in the global OGI with a production of about 939,760 barrels per day and ranking 4th in terms of oil production in Europe (Oil and Gas, UK, 2018). Additionally, UKCS operations are served by a world-class UK supply chain, with skilled jobs and a significant turnover peaking at almost £40 billion in 2013 (Oil and Gas UK, 2014). Hence, findings from this study may be relevant to other similar industries, both within and outside of Europe.

1.9 CONTRIBUTION AND ORIGINALITY

As discussed above, coopetition studies are still emerging in management studies, particularly within the supply chain field, although, some studies in this field appear to focus primarily on horizontal relationships in the supply chain network. Other studies attempt to offer descriptions about, essential elements involved in coopetitive relationships; such as guides on partner selection, success factors. This study goes a step further by developing a framework, to test how certain factors such as the management and control can impact the outcome of coopetition performance. Additionally, the application of coopetition to the oil and gas industry is significantly under-researched, even though there is an opportunity for simultaneously collaborating and competing in an industry that is highly competitive such as the oil and gas industry. Therefore, this study would advance knowledge by investigating the occurrence of coopetition within the oil and gas industry.

Regarding the methodological approach, very few coopetitive studies have adopted mixed methods to uncovering the coopetition themes, with fewer studies utilising the structural equation modelling. As a result, there is a noticeable lack of pre-tested questionnaire items to measure some constructs within the coopetition field of study. This study, therefore, broadens the field of coopetition research by testing some additional questionnaire measures to be used in survey research and also adopts mixed-method study to understanding coopetition.

1.10 STRUCTURE OF THE THESIS

The structure of the thesis reports on all aspects of the research conducted in this study, and it is presented in a five-chapter format (Perry, 2002) as illustrated in Figure 1.3, with each chapter containing several sections and subheadings.
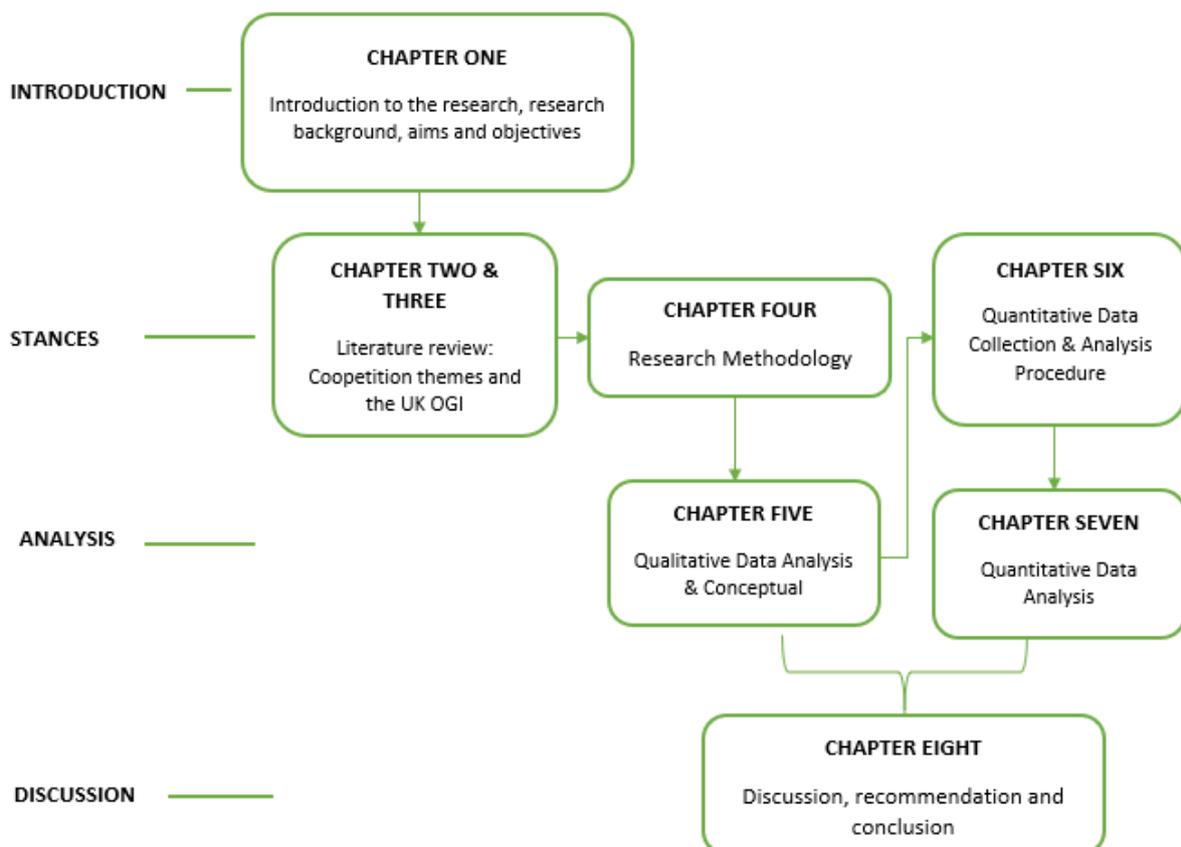
Figure 1.3: Structure of the Thesis

Developed for the study

Chapter One: provides an introduction to the study by way of presenting the theoretical background to the research. The justification for the study and the research propositions and objectives are discussed. The methodology for the research will also be addressed, and the outline for the report is presented.

Chapter Two: deals with the existing and pertinent literature on the coopetition and its strategies. It aims to provide a broad overview of prior scholarship on the concept of coopetition, its tensions, and other related themes. It includes the context for the research, a section covering the relevant coopetition themes such as its paradoxes and tensions, management. The chapter also discusses inter-organisational studies, its levels, networks and its implications on coopetition studies.

Chapter Three: The chapter reviews the Oil and Gas Industry in relation to the coopetition strategy. It introduces the OGI, discussing how the UK Oil Sector evolved as well as its current state. It also highlights how the coopetition concept can be applied in the industry. The chapter concludes by asking the final research questions for the study.

Chapter Four: introduces the research design and methodology used for this particular study. The research paradigm underpinning the research is chosen and justified. It includes the details on the design of the survey instrument, the data collection and the ethical considerations. The limitations of the research pertaining to the methodology are also discussed.

Chapter Five: examines and discusses the results of the concept clarification and initial explorative semi-structured interviews. The analysis of the qualitative data is then used to develop the research hypothesis and conceptual model for the study.

Chapter Six: explains the procedures for the quantitative data collection and the data collection instrument used in the study. It also discusses the outcome of the studies, piloting to access the reliability and validity of the data collection instrument. The sampling design and distribution techniques, the response rate, issues in recruiting participants are discussed. Additionally, the data analysis procedures, which includes the approach to cleaning and accounting for missing data, a reliability and validity test, procedures to account for common method bias and an overview of the SEM in AMOS is presented.

Chapter Seven: presents the results of the survey analysis. A descriptive summary of the data is given, and a detailed analysis of the research data using several techniques in structural equation modelling to estimate model fit and test the hypothetical propositions.

Chapter Eight: serves as a conclusion to the research. The research propositions and objectives, as outlined in Chapter One, are revisited and findings made. The limitations of the study and suggestions for further research are also covered.

1.11 CHAPTER SUMMARY

This chapter was an introductory chapter; it laid the foundation for the study. The section began with a brief overview of the study; it also provided background and rationale for the study. It also provided a methodology for the research. The chapter also discusses the structure of the study.

The following chapter, which is the review of existing pertinent literature, would discuss relevant literature for the study; it would include theoretical underpinnings as well as a research context. The final research questions would also be asked.

Chapter 2: LITERATURE REVIEW
2.1 INTRODUCTION

The previous chapter introduced the thesis topic, provided a general overview of the study, and justified the importance of the research area using relevant literature. The chapter also identified the aims and objectives of the study, presented the initial research questions, the research rationale and the structure of the research.

In this chapter on literature review, existing research by credible scholars are explored and critiqued on their relevance to the research topic. Researchers use the scholarly literature in a study to present results of similar studies, to relate the present research to the ongoing dialogue in the literature and to provide a framework for comparing results of a study with other studies. According to Bruce (1994), the literature review is an essential chapter in a thesis as its purpose is to provide background and justification for the research undertaken.

For this research, the literature review would focus on pertinent literature relating to inter-organisational strategies and supply chain management, especially with regards to coopetition. This review is aimed at identifying the gaps in existing studies that motivate the research plans, as well as provides a basis for subsequent research questions. Eriksson (2008) believes that a properly written literature review is characterised by a coherent flow of thoughts which is impartial and comprehensive. It may also contain scholarship which is theoretical, analytical, empirical or methodological.

Furthermore, owing to the complex nature of the research questions and how it relates to the contemporary world and its potential industrial application, it is crucial to review the literature to clarify gaps in knowledge and develop a more informed research question. Thus assisting in the development of a context for the research with a rounded view of the components that form the reality as pertinent fundamental conceptions such as trust, tensions in coopetition, alliance function, contractual control, are examined. For the specific purpose of this research, this chapter tries to provide a unified body of text that analyses the critical themes of existing knowledge on coopetition and coopetitive relationships and how it is applied in industries to ensure a successful implementation.

2.2 RESEARCH CONTEXT

This section of the literature review develops from the research background discussed in chapter one (section **Error! Reference source not found.**). The section provides a broad overview of the relevant themes and the relationship between them. It also serves to introduce the context in which the study aims to review the existing literature in management literature.

Coopetition is now recognised in management literature as an IOR, capable of increasing innovation among businesses while providing costs and risks reducing opportunities for the individual organisations (Gnywali and Park, 2009; Li et al., 2012; Ritala et al., 2016; Roig-Tierno et al., 2018; Runge et al., 2019). There are several pieces of evidence of successful coopetition practice, such as the relationship that exists between Yahoo and Bing, selling ads on the same platforms, to compete against Google (Velu, 2018). As discussed in the previous chapter, several factors can motivate organisations to engage in coopetitive alliances, e.g. creating a broader market, organisations jointly competing against a larger competitor or even to create a monopoly (Pulles, 2014; Wolff, 2016; Cygler et al., 2018).

Since the conceptualisation of coopetition by Brandenburger and Nalebuff (1996), several studies have investigated the nature and practicality of the concept. For example, Morris et al., (2007), explores the relevance of the coopetition strategy for small businesses, Chen et al., (2008), studied its success factors, developing a hierarchal model for successful coopetition, Osarenkhoe, (2010), investigated the impact of the alliance with regards to value generation, Fernandez and Chiambaretto (2016) addressed tension management in a coopetition alliance Barney et al., (2017), reviewed the relationship between coopetition and innovation, Sahlan et al., (2018), examined the influence of religion on adopting the coopetition strategy.

Despite the increasing attention, there still opportunities for further studies, particularly with regards to providing a framework for successful application in industries. Even though there are studies discussing coopetition success factors (Chen, 2008; Ritala, 2012; de Resende, 2018), managing coopetition (Bengtsson, 2014; Wilhelm and Sydow, 2018; Le Roy et al., 2018; Chiambaretto et al., 2019), levels and phases of coopetition (Dorn, 2016; Tidström and Rajala, 2016; Bouncken et al., 2018; Granata et al., 2019), there is no unifying study providing a guide for parties interested in engaging in a coopetitive relationship.

Notably, Wolff (2016) developed a Coopetition Implementation Framework (CIF), to serve as a guide to managing coopetition relationships, the framework focused primarily on partner

selection in the alliance. Relevant coopetition issues such as relationship and tension management, control and governance techniques were missing from the framework. Hence, the CIF needs extending to capture management and control issues which would be beneficial in ensuring successful coopetition.

In order to develop a coopetition guideline, it is necessary to review the primary elements of the strategy. The motives, formation, tension management, governance mechanisms guiding a coopetition relationship would be investigated to advance the understanding of the strategy and improve the success rate. Understanding the motives for engaging in a coopetition alliance may be vital in managing the relationship. For example, some organisations may enter into a coopetitive agreement for opportunistic reasons or promote illegal anti-competition practices by creating a monopoly (Bengtsson, 2014; Tidström and Rajala, 2016), which can put the other partners in jeopardy legally and economically. Therefore, the management of coopetition practices should be critical in any coopetitive endeavour.

Additionally, the activity an organisation should coopete on as been subject to intense debate. For example, authors believe that coopetition should only occur in non-core functions of the organisation, to minimise the risks associated with the strategy (Dussauge and Garrette, 1997; Radziwon et al., 2017; Holotiuk et al., 2018). Whereas other authors claim that coopetition would offer more benefits if it occurs in core activities (Bouncken et al., 2015; Klimas and Czakon, 2018; Crick, 2018). These authors suggest that organisations should be more concerned about the proximity of the coopetition alliance to their final customers.

Another area in coopetition studies that is vital to this thesis is the governance technique to control and guide the relationship. Relational governance, such as trust, is perceived not just as a governance structure but also a critical coopetition success factor (Chen, 2008; Ritala, 2012; de Resende, 2018). Although earlier IOR studies argue that trust does not exist IO alliances, instead organisations manage risks as it pertains to the situation (Sako, 1990; Cousins, 2002; Lee et al., 2018; Raza-Ullah et al., 2018). Additionally, studies have established that contractual agreement enables trust development in IORs (Sako, 1990; Mellewigt et al., 2007; Chai et al., 2019). This thesis investigates the governance techniques and how it affects the outcome of coopetition.

The formation of coopetition is also a crucial aspect of coopetition studies. According to Mintzberg and Water (1985), strategies can occur despite a lack of intention. With regards to coopetition, some authors argue that due to the complex nature of the alliance, the strategy

cannot occur without careful considerations, also adding that the absence of intention in a coopetive endeavour is farfetched as there are no pure emergent strategies (Lundgren-Henriksson, 2017). Additionally, most of the early coopetition studies, emphasises the intentionality of coopetition, citing its inherent benefits as a motivating factor for organisations (Brandenburger and Nalebuff, 1996; Bengtsson and Kock, 2000; Luo, 2004; 2007). More recent studies on coopetition development strategies acknowledge both its deliberate and emergent nature (Mariani, 2007; Czakon and Rogalski, 2014; Dahl et al., 2016), especially considering the impact the external business environment has on organisations (i.e. government regulation, industry changes). However, it is unclear if the success factors critical to ensuring successful coopetition in a deliberate coopetition alliance can create a similar outcome in emergent coopetition. Does the nature of coopetition formation affect the outcome of the alliance? It is essential to investigate this notion since the industry under review in this study is highly influenced by external factors and may experience unintentional coopetition.

Additionally, following a review of coopetition literature, it was observed that much of the current debate is focused on strategic management as can be seen in (Figure 2.1). State-of-the-art literature review on coopetition, show that most of the coopetition studies are in the field of strategic management (Bengtsson and Kock, 2014; Bouncken et al., 2015; Gast et al., 2015; Devece et al., 2019). This attention is not surprising as the coopetition is perceived as a strategy which offers several benefits to organisations, the industry and even the economy of a nation (Gulati et al., 2000; Bengstsson and Kock, 2014). To address the paucity of literature in other management fields, scholars have stressed the need to take advantage of the vast opportunities in other management areas to advance the coopetition literature (Devece et al., 2019). Therefore, this study continues the discussion on coopetition within the SC body of knowledge.
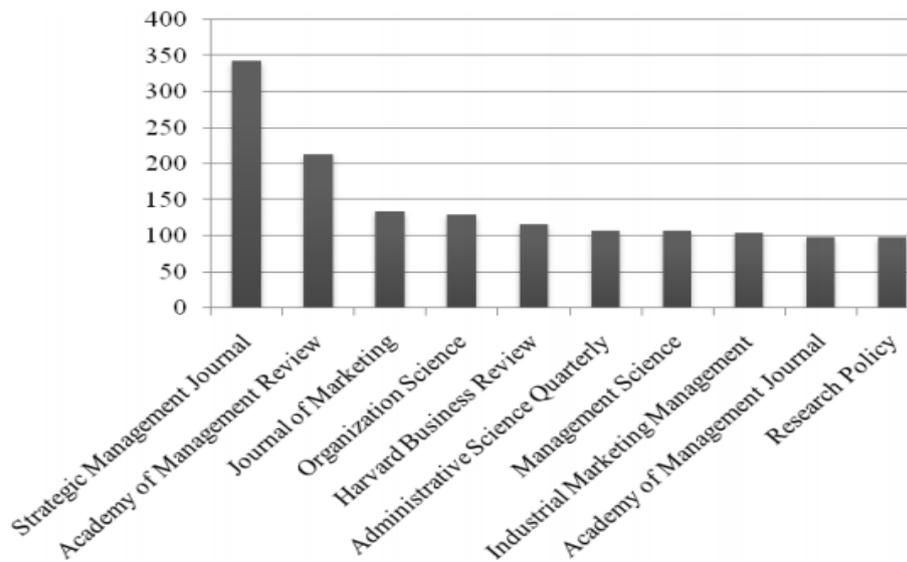
Figure 2.1: Frequently cited journals in coopetition research.

Source: Gast et al. (2015, p. 6).

One of the objectives of this thesis (objective 1, see page 26) is to conduct a thorough and comprehensive review of existing pertinent literature in the field of IORs and coopetition. In order to achieve this objective, the literature review would be conducted in a systematic format to ensure a coherent flow of idea, and to allow easier identification of the knowledge gaps.

Therefore, the literature review is divided into four main parts, as follows:

- The first part of the review explores inter-organisational relationships, its definition, nature, formation, antecedents, levels. The purpose of this section is to set the scene and provide more insight into the understanding of coopetition strategy.
- The second part of the literature review explores the coopetition strategy; its definition, scope, motivators, its evolution in management studies, typologies, nature, drivers, success factors, management, formation. This section serves to identify the gaps in the coopetition field of study.
- The third part clarifies the knowledge gaps identified from the review of coopetition studies. This section focuses on coopetition management, the governance structures, and the nature of coopetition formation.
- The fourth part of the review explores coopetition from a SC viewpoint. Mainly, it explores the role of SCF on coopetition.

- This section of the literature review investigates the OGI, its nature, SC and forms of IORs adopted in the industry. It explores opportunities and disadvantages for the application of the coopetition strategy in the industry.
- Finally, research questions for further investigation are posed.

2.3 INTER-ORGANISATIONAL RELATIONSHIPS AND NETWORKS
2.3.1 Defining Inter-Organisational Relationships

Defining the relationships that occur among various organisations seems like a logical starting point for this study, which is centred around coopetition an inter-organisational relationship that occurs among competitors. This section seeks to uncover what elements are vital in defining and the classifications of IORs to allow proper positioning and exploration of the coopetition concept.

The term 'inter-organisational relations' which first appeared in the 1960s is an umbrella term to describe relationships that occur between and among organisations (Cropper et al., 2008). Inter-organisational relationships in management literature refer to the interactions that occur between and among independent organisations, pursuing mutual goals and retaining their separate interest (Bengtsson and Kock, 2000; Tonge, 2012; Ebers, 2015; Agostini and Nosella, 2017; Oliveira and Lumineau, 2019). The relationship can exist among various types of organisations, including private or public businesses, non-profit organisations, state-owned enterprises, governmental agencies and non-governmental organisations (NGOs) (Cropper et al., 2008). Additionally, the relationship can be between two organisations, multiple organisations or a network of organisations. An IOR can occur in many forms, such as joint ventures (JV) (Nippa and Reuer, 2019), strategic alliances (Link and Antonelli, 2018; Robson et al., 2019), consortia (Chen, 2019), partnership (McCarthy, 2016), sourcing agreements (Park et al., 2018). Studies on IORs focuses on their origins, the patterns of relationship among the parties, the formation, survival, growth, management, dissolution and the consequences of the relationships (Copulsky and Wolf, 1990; Osborn and Hagedoorn, 1997; Murphy et al., 2005; Cropper et al., 2008; Eber, 2015; Oliveira and Lumineau, 2019).

There are several definitions of IORs in management literature, for instance, Anderson and Narus (1991), define IOR as the set of social economic and technical ties that exist between two business organisations. This definition suggests that IORs are useful in creating helpful links to sharing resources or capabilities to meet the specific needs of an organisation. Kanter (1994), opts that a business relationship is a connection based on mutual agreement between

otherwise independent organisations, that can take different forms and contains the potential for further cooperation, to achieve added value. Similarly, Eikebrokk and Olsen (2005), perceive IORs as being advantageous for risk reductions and helps improve the competitiveness of the organisations in its business environment.

According to Peng et al. (2012), the most crucial characteristics of an IOR is mutuality based on the exchange of cooperative and competitive activities on an organisational level. Exchange in IOR refers to a voluntary activity between two organisations which has consequences, actual or anticipates, for the realisation of their respective goals and objectives (Levine and White, 1961; Ritter and Gemünden, 2003; Gulati and Nickerson, 2008; Huang, 2016; Roehrich et al., 2019). This definition suggests that for an IO exchange to occur, there must be an understood requirement by the partners, to voluntarily participate in a beneficial relationship.

Furthermore, studies have established that for a successful IO alliance to occur, it must be time-bound. Exchange in IORs occur through a single interaction between organisations over an agreed timeframe, and continuous exchanges between these organisations result in a relationship (Johanson and Mattson, 1987; Lui, 2009; Marion et al., 2015; Howard et al., 2019). The definition shows that the notion of time is vital in IORs, as these bonds connect organisations, and the time duration is dependent on the outcome of prior interactions. The role of time in IO exchanges and interactions is not only useful for defining the timeframe of the relationship but also influences the subsequent interactions and manages the expectations of the organisations (Hakansson and Ford, 2002; Marion et al., 2015; Heaphy et al., 2018; Oliveira and Lumineau, 2019).

Another crucial element of IOR, as identified by Clark (1998), is the definition of goals and expectations for the interaction is useful to determine behavioural patterns in an IOR. For instance, an organisation needs to determine the benefits a relationship would offer and decide if it is beneficial before the relationship begins. The two crucial elements of interaction that can help define goals are time and space. As presented above, time is relevant as lessons learned from previous interactions are beneficial in setting expectations and boundaries for the current and future interactions in IORs. Similarly, space refers to the context where organisations interact with each other using the availability of resources and the type of activities it engages in as the significant deciders of the outcome of their interactions (Johanson and Mattson, 1992; Jaskyte and Lee, 2006; Mallapragada et al., 2015; Mandják et al., 2016; Bouncken and Aslam, 2019).

Moreover, authors have classified the interactions between organisations into three primary categories (implicit, explicit and asymmetric), depending on the level of relationship awareness (Clark, 1998; Provan and Sydow, 2008; Marion et al., 2015; Harmeling and Palmatier, 2019). Implicit interactions occur when an organisation is unaware of the effects another organisation has on its business, while interaction is explicit if all organisations are aware of each other and the exchanges between them and can be hostile, responsive or benign. Asymmetric interactions assume that one organisation is more aware of the benefits from the relationship than the other and can take advantage of this knowledge (Clark, 1998; Harmeling and Palmatier, 2019). This categorisation implies that the level of awareness of an IOR differs and can affect the outcome of the relationship, suggesting that organisations explicit recognition offers mutual benefits, seeing as the other levels increase the risks to organisations. Interestingly, the various levels of awareness of the effects of an organisation on another is an essential conceptualisation for emergent coopetition. Organisations that have both implicit and asymmetric level of awareness of IO interactions could be potential candidates of emergent coopetition.

In sum, IORs are deliberate interactions that occur among one or more organisations, over a specific period, and space to add value to the performance of the individual organisations. However, while organisations can access the potential benefits of engaging in an IO interaction, there is a likelihood that they are unaware of the effects of other organisations on their performance. Thus, organisations should set prior boundaries or expectations before interacting with other firms.

2.3.2 Defining Inter-Organisational Networks

In management studies, networks refer to any pattern of relationships that exist among individuals or organisations, where each member is linked or connected to the other members either directly or indirectly (Provan et al., 2007; Padula and Dagnino, 2008; Baker and Faulkner, 2017; Jung et al., 2019). Brass et al. (2004), defined networks in the form of nodes, which represents the actors in alliances. According to them, a network is a set of nodes and the set of ties which represents the relationships between the nodes, which can occur directly or indirectly.

In IO networks, organisations tend to create dependent links to oversee the management of the network, which is instrumental in determining the potential outcomes and behaviours within a system (Bengtsson and Kock, 2000; Baker and Faulkner, 2017). These links could combine

both competitive and collaborative motives, where the participating organisations have private or mutual interests, implying that relationships in a network can manifest in several forms (Abdallah and Wadhwa, 2009; Baker and Faulkner, 2017).

In many instances, the presence of network ties signifies the existence of a relationship, although, the intensity of the connection influences how organisations relate with each other and create the avenue for identity formation within the networks (Gulati et al., 2000; Brass et al., 2004; Provan et al., 2007; Agostini et al., 2019; Mitterlechner et al., 2019). These authors agree that strong ties between organisations suggest a close and stable interaction with high intensity in the relationship, characterised by regular communication and results in continuous collaborative interests. Whereas, organisations with weaker ties involves casual, one-off exchanges that are temporal or indirect. Therefore, interactions between organisations are integral to network arrangements and can drive the formation of business relationships to create a network structure.

Poulymenakou and Klein (2006), realised that because networks require a higher level of social integration, they have a dual boundary setting, internal and external boundaries. From the internal perspective, organisations within a network need to define their shared values, to align their shared interests, allowing them to take advantages of opportunities within the network. From the external viewpoint, the members of the network set the boundaries. Although, Hakansson et al., (2009), points out that even though the interactions between organisations in a network are complex, they are a fundamental dynamic of the relationship because these interactions determine the development of the links.

Accordingly, networks highlight a connectedness that suggests that relationships cannot exist in isolation or independently. Thus suggesting that within this study, the network is characterised by an agreement based on mutual expectations to engage in business interactions, even though, the form and intensity of the interactions may not be appropriately defined.

2.3.2.1 *Levels of Analysis in Network Research*

Studies relating to IO alliances highlight the importance of the relationship ties that organisations create. Hence, the interests that surround the associations between organisations in IO networks reviews has advanced in many disciplines (Provan et al., 2007; Albers and Schweiger, 2011; Baker and Faulkner, 2017; Agostini et al., 2019).

Fundamentally, for the network typologies existing (e.g. IO networks, organisational networks, intra-organisational networks), the structure of the network and the way the relationships are analysed are similar. For example, the levels of the relationships are studied under three categories, i.e. macro, meso and micro levels. The macro-level analyses the relationship between groups of organisations at the industry level, the meso-level is concerned with both the number of organisations in the interaction, i.e. dyadic and the positioning of the interaction, i.e. horizontal or vertical, while the micro-level investigates the number of interactions that occurs between the units and individuals in an organisation (Dagnino and Padula, 2002; Provan et al., 2007; Knoben et al., 2018).

A typology by Albers and Schweiger (2011) present a contrasting view of how cooperative and competitive relationships should be studied. They showed four groups of cooperative-competitive relationships that combine the primary focus of organisations with their relational focus (Figure 2.2). This study seeks to make sense of the IORs in the oil and gas industry from a network perspective; thus, group two and four, which focuses on the network level analysis would be discussed.

	Group 2 Cooperation and competition within networks (network perspective) *The focus of analysis is on network relationships*	Group 4 Cooperation and competition between networks *The focus of analysis is on network relationships*
Primary organizational focus	Group 1 Cooperation and competition within firms *The focus of analysis is on the single firm*	Group 3 Cooperation and competition between firms (organisational perspective) *The focus of analysis is on the single firm*
	Internal relations	External relations
	Primary relational focus	

Figure 2.2: Level of analysis for IORs and networks (Albers and Schweiger, 2011 p. 95)

Group two focuses on network relationships, with primary analytical emphasis on single organisations. Specifically, this group analyses the relationships within organisational networks. It applies a network perspective that suggests that network structure may offer

valuable insights into the relational ties of organisations and the relevance of an organisation's position in the network (Gnywali et al., 2006). Whereas, Group four focuses on the external competitive relations of among two or more networks to create benefits to its members either by competing against other networks to gain more members, and to retain and gain a more extensive customer base. Therefore, the positioning of this thesis falls within group two of this typology as it seeks to investigate the coopetitive relationships between single organisations within a network (oil and gas) for improved performance.

2.4 COOPETITION IN CONTEXT

The origin of the term coopetition is not clear, as literature provides several accounts of how the term came to be. Some authors argue that the term was first used in 1913 by a merchant to describe the cooperative relationship between some of his suppliers (Cherrington, 1976), others claim that its initial usage was in a 1937 article by the Los Angeles Times (Smith and Vogel, 2010). However, the most famous account believe that the term was coined by Ray Noorda, the former CEO of Novell in 1990, to depict the relationship between his competitors (Dagnino, 2007).

Notwithstanding its initial use, the term attained popularity in management literature, following an in-depth conceptualisation by Brandenburger and Nalebuff in 1996. According to Brandenburger and Nalebuff (1996), coopetition is more than just a linguistic combination of competition and collaboration, but a mindset and a phenomenon that combines two juxtaposing concepts to create value. Likening the coopetition to pies, they argue that the collaboration aspect of the relationship allows parties to create a larger pie, while simultaneously competing to obtain a more substantial portion of the 'pie'.

Even though the term and the strategy attained popularity in 1996, and has since gained the attention of many scholars, there is yet to be a single accepted definition for the term (Padula and Dagnino, 2002; Peng et al. 2012; Bouncken et al., 2015; Devece et al., 2019). Nonetheless, scholars agree that coopetition involves competitors, cooperating to create value and by combining resources to achieve a mutual goal, while also attempting to attain a more significant competitive edge (Bradenburger and Nalebuff, 1996; Bengtsson and Kock, 2000; Luo, 2004; 2007; Kwai-Sang and Chan, 2008; Yami et al., 2010; Ritala et al., 2016; Bouncken et al., 2018).

Competition is the rivalry that occurs between organisations for resources, consumers, profits and even prestige (Simandan, 2017; Swab and Johnson, 2019), while cooperation involves more than one organisation engaging in a mutually beneficial relationship instead of competing (Lindenfors, 2017; Le Pennec and Raufflet, 2018). The combination of the two different forms of IOR shows that adopting this form of alliance would prove complex, especially since organisations' motives for coopetition may be blurry and can lead to uncertainty of the parties involved. Hence, this section would investigate the coopetition strategy to uncover, its evolution, the various levels, motives, trends of the concepts and raise questions regarding the practicality of the approach.

2.4.1 Definition and Scope of Coopetition

Since the conceptualisation of coopetition by Bradenburger and Nalebuff (1996), the topic has become popular in management literature. Many authors have offered several definitions for the term in academic literature. For example, Lado et al. (1997) described coopetition as a 'rent-seeking strategic behaviour' (p. 122) that seeks to provide a productive balance between competitive and collaborative strategies. Similarly, Zeldin, (2004), suggests that a coopetitive relationship is a form of affiliation that exists between various independent organisations with common interests that are simultaneously collaborating and competing with one another.

Although there is a unanimous agreement about the nature of coopetition, researchers have investigated the concept from several viewpoints to help develop an extensive understanding of the complex phenomena. Despite the vast studies, there is yet to be one single accepted definition of the construct (Padula and Dagnino, 2002; Peng et al. 2012; Bouncken et al., 2015; Devece et al., 2019). However, the review of existing literature highlights three primary approaches to defining coopetition.

Firstly, several authors have conceptualised coopetition as an IOR, which combines and alternates between both converging and diverging interests of competition and collaboration (Figure 2.3) (Bradenburger and Nalebuff, 1996; Bengtsson and Kock, 2000; Padula and Dagnino, 2007; Czakon, 2010; Rusko, 2011; Czachon and Mucha-Kuś, 2014; Lundgren-Henriksson and Kock, 2018; Zacharia et al., 2019). For example, coopetition is portrayed as a form of interdependence, based on converging, overlapping benefits, such as value creation through knowledge sharing (Dagnino and Padula, 2002; Padula and Dagnino, 2007; Loebbecke

et al., 2016). The significance of this approach is that there are varying motives of focal organisations engaging in a collaborative association. Several studies, particularly within strategic alliances, investigates the various interests of organisations across several alliance portfolios (Dyer et al., 2008; Wassmer, 2008; Hoffmann, 2007; Lavie, 2007; Ritala, 2012; Bengtsson and Kock, 2014; Raza-Ullah et al., 2018). Generally, studies within this approach investigate the emergence of competition within collaborative endeavours.
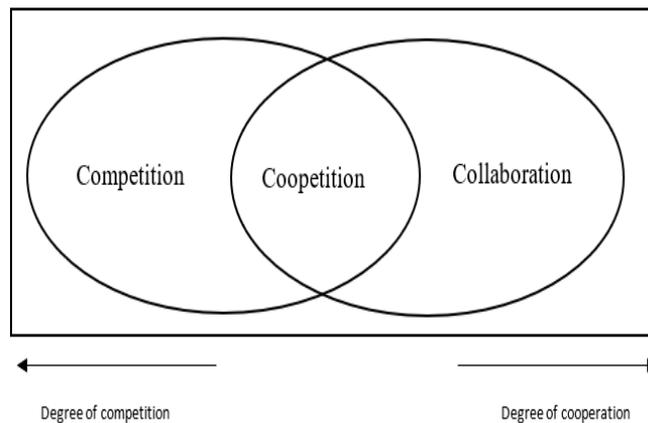
Figure 2.3: Defining the Elements of Coopetition (Rusko, 2011 p. 312)

Another approach considers coopetition from an institutional perspective. Breznitz (2007 p. 3), defines coopetition as "*a systemic institutional configuration that shapes the capabilities and behaviour of specific industries and clusters of firms*". This approach follows from Porter's (1985) school of thought that believes public policies should be considered when managing coopetition because they can influence successful coopetition practices within networks of organisations and thus impacts the success of the organisations. This definition of coopetition can be interpreted in two distinct ways; on the one hand, it may suggest that a coopetitive relationship on a network level between two varying industries characterised by their rules would uncover several competencies for both sectors to flourish. On another hand, it seems to advocate for network-level coopetition, such that an industry, for instance, the OGI, encourages coopetition among the firms in the industry to strengthen the overall performance of the industry. This approach to defining coopetition is essential to this study as one of the central focus of the research in line with Wood (2014) recommendation of collaboration, suggests that when companies within the industry engage in coopetition, it can improve the industrial performance.

The third approach to defining coopetition is as a conduit for an organisations value creation and appropriation. According to Bradenburger and Nalebuff (1996), coopetition occurs when an organisation collaborates with other organisations within its value net (Figure 2.4) for value creation and then competes to earn a more significant competitive edge based on the value created. This definition is from the game theory perspective and is based on two coordinating games, prisoner's dilemma and the stag hunt (Ritala and Hurmelinna-Laukkanen, 2009). Bradenburger and Nalebuff (1996), proposed the value net, as a tool for mapping the set of competitive and collaborative involvement of an organisation. The definition extends the conventional Porters Five Forces by including the sixth force; products and resources complement (Porter, 1985; Brandenburger and Nalebuff, 1996).
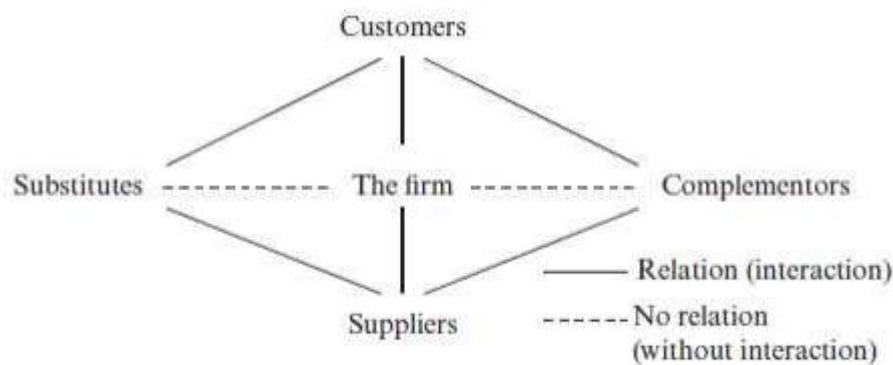
Figure 2.4: The Value Net, (Brandenburger and Nalebuff, 1996, p.30)

Studies regarding viewpoints suggest that even though the two progressions of value creation and value appropriation are different in their competitive and collaborative tactics, there is still an interrelationship between them. Thus, researchers believe that the two functions together make up is the foundational principle of an organisations' performance generation (Teece, 1986; Teece et al., 1997; Teece, 2006; Afuah, 2009; Rusko, 2011; Ritala and Tidström, 2014; Park et al., 2014; Volschenk et al., 2016; Bouncken et al., 2019).

The three definitions discussed above are accepted and crucial for this study. The initial conceptualisation of the coopetition, which forms the basis of the coopetition research, suggests that for coopetition to exist, there must be an interaction between the two opposing elements of IORs (competition and collaboration), and from a network perspective, industries encouraging coopetition among its operators can improve the performance of the sector and finally, coopetition is a beneficial strategy for value creation and appropriation.

Additionally, coopetition was defined with respect to its process of occurrence, where it was described as an IOR, with the cooperative and competitive interactions unfolding over time (Bengtsson et al., 2010). This view considers coopetition through two continua. One continuum perspective (Figure 2.5), suggests that coopetitive relationships exist between two extremes, the other (Figure 2.6) argues that the cooperative and competitive elements can co-exist from one continuous dimension.
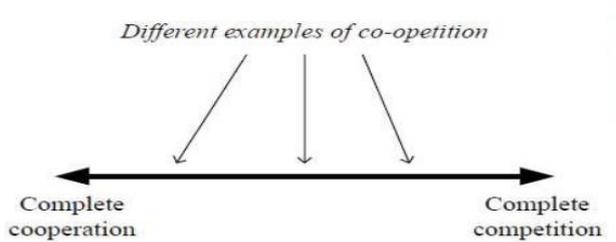
Figure 2.5: Coopetition one continuum (Bengtsson et al., 2010 p. 199)

In essence, (Figure 2.5) suggests that for coopetition to occur, the cooperative and competitive interactions should be extreme (i.e. high competition and high cooperation), while (Figure 2.6), shows that the cooperative and competitive elements can occur in any dimension (i.e. strong competition and weak cooperation). The second perspective, (coopetition on two continua), is in line with the aim of this thesis, as such, this definition would be adopted for this study.
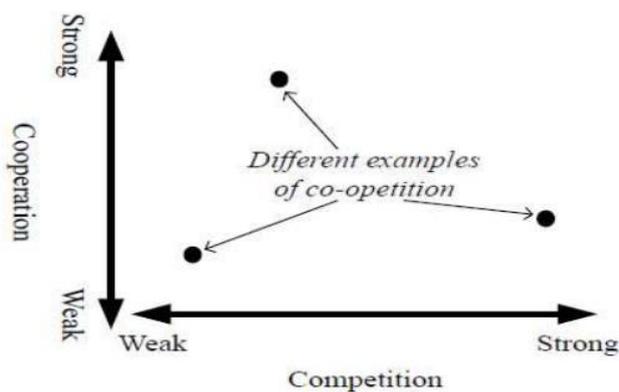
Figure 2.6: Coopetition on two Continua (Bengtsson et al., 2010 p. 199)

Interestingly, most coopetition literature is based on this standpoint, albeit some studies focusing only on some of its characteristics. For instance, some studies investigate some

competitive tendencies amongst organisations with familiar collaborators, which are its customers, suppliers and complementors (Dowling et al., 1996; Khanna et al., 1998; Di Guardo and Galvagno, 2007; Padula and Dagnino, 2008; Afuah, 2009).

2.5 REASONS AND MOTIVES FOR COOPETITION

One of the popular areas of studies in coopetition literature is uncovering the reasons and motives for organisations to engage in the relationship. The most common reason for coopetition identified in management literature is value creation to improve the financial position of the organisations (Brandenburger and Nalebuff, 1996; Bengtsson and Kock, 2000; Ritala and Tidström, 2014; Raza-Ullah et al., 2018; Cygler et al., 2018). From the resource dependence theory and the resource-based view, organisations seek to utilise their resources efficiently to remain productive and retain or improve their competitive standing (Oum et al. 2004; Garrette et al. 2009; Ritala 2012; Dorn et al. 2016; Devece et al. 2019).

Bengtsson and Raza-Ullah (2016), while investigating the motives for coopetition, categorise the coopetition drivers into three classes, namely: internal, external and specific to the alliance. According to them, the internal drivers refer to specific motives such as capabilities, resources that can encourage organisations to collaborate with the competitors (Luo 2007; Gnyawali and Park 2009; Ritala et al. 2014). The external drivers are environmental or industry-specific factors that force organisations into coopetition (Sahaym et al. 2007; Ritala 2012; Bengtsson and Johansson 2014). The drivers specific to the alliance relates to the specific factors in relationships between partners that can enable the formation of a coopetition alliance (Khanna et al. 1998; Luo et al. 2008; Peng and Bourne 2009; Gnyawali and Park 2011).

Scholars have observed that there are several economic (Osarenkhoe, 2010; Barney et al., 2017; Fernandez et al., 2018), social (Stree et al., 2016; Wang, 2018), and strategic (Tidström and Rajala, 2016; Christ et al., 2017; Monticelli, 2018) factors that have necessitated the need for coopetition among organisations. For example, coopetition can assist rivalling organisations in enhancing their internal capabilities, ensure technological advancements and improve the efficiency of their operations (Hamel et al., 1989; Luo, 2007; Gnyawali and Park 2011; Czakon et al., 2015; Cygler et al., 2018).

Additionally, Hamel (1989; 1991), rationalises that close collaboration among competitors can allow an organisation to absorb the competencies and skills of their rivals while being

protective of revealing their skills. Hamel (1991), points out that coopetition allows organisations to benefit from one another (quasi-internalisation) and offers the opportunity to acquire the skill of competitors (de facto internalisation). Luo (2007), in agreement, argues that the skills inherited from competitors can subsequently be adapted to new products and markets to improve the market value of the organisation.

Absorbing the skills of competitors, particularly those in coopetition relationship is called opportunism and is the most common danger of coopetition identified in the management literature (Tidström, 2014; Estrada, 2018; Kraus et al., 2018; Chai et al., 2019). The fear of opportunism among coopetition partners is one of the major factors that deter organisations from adopting the coopetition strategy. Studies show that it is not uncommon for organisations to give away more than they gain in the risk-return equation; this imbalance is because of improper application of the coopetitive strategy (Luo, 2007). Therefore, several coopetition studies are devoted to the proper management of coopetition relationship to minimise the risks of opportunism (Luo, 2007; Tidström, 2014; Czakon et al., 2015; Cygler et al., 2018). For example, such as internal stability, proximity to the customers, activities to collaborate are some factors that can assist organisations in addressing opportunism in a coopetitive relationship (Tidström, 2014; Estrada, 2018).

Another motivation for coopetition is the associated benefits that are attainable from the alliance, such as, risk, cost and uncertainty reduction in new products development and innovative endeavours (Luo, 2007; Ritala and Hurmelinna-Laukkanen, 2009; Bouncken and Kraus, 2013; Ritala et al., 2016; Roig-Tierno, 2018). According to Luo (2007), due to the high costs and risks involved in innovation, and market entry for new products, organisations, may consider collaborating with competitors who already have similar competencies and target audience, as they would have insights to the needs of the market and the business environment, which can ease the process of new product development and create value for the organisation.

To explain the factors that can motivate organisations to engage in coopetition, Song (2004), developed a framework that categorises the factors which motivate coopetition endeavours (Figure 2.7) into five groups; strategic, economic, operational, marketing and financial.
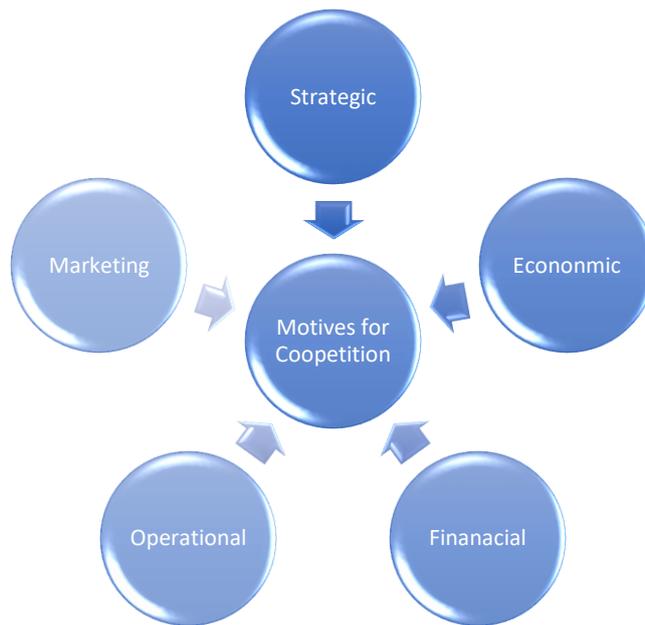
Figure 2.7: Motivation for Coopetition (Adapted from Song, 2004)

Strategic motives are the most popular and widely researched motive for coopetition because it involves market positioning and relates to resources and resource allocations to create long-term benefits for the organisation (Schwab, 2012; Christ et al., 2017). Innovativeness, market expansion, enhancing competitive advantage are some of the benefits for coopetition motivated by strategy. The strategic motivation for coopetition is influenced by the opportunities organisations have to take advantage of each other's complementary resources (Song, 2004; Tidström and Rajala, 2016). With regards to economic motivation, authors found that factors such as promoting economies of scale, increasing organisations capabilities can motivate coopetition and create collaborative advantage (Contractor and Lorange, 1988; Song, 2004; Fernandez et al., 2018). Similarly, organisations engage in coopetition to reduce costs and share financial risks, as most organisations aim to attain a robust bottom-line, which can be achieved by joint investment (Song, 2004; Bengtsson and Kock, 2000; Wang, 2018). Operational motivations are also crucial because operations can be improved by sharing knowledge or know-how that can enhance the quality of service and consequently result in more profit (Hwang and Chiang 2010). Additionally, technological advancement and marketing capabilities are other factors that can motivate coopetition. For example, Chim-Miki and Batista-Canino (2017), using the tourism sector as a case study argues that sharing marketing designs increases value creation.

From the above, there are several motivations for OGI to engage in coopetition. For instance, on a strategic level, the industries, as well as the operators within the sector, can adopt the strategy to improve the rate of innovativeness, and reduce the cost of operations, which also relates to economic, technological and financial motivation.

Notably, deciding on the coopetition motives using Song (2004) framework may be difficult as there seem to be overlapping elements amongst them. For instance, strategic and economic reasons are inter-related as they aim to improve competitive positioning and reduce costs for the organisation. Consequently, Möller and Rajala, (2007), suggests that the motives for coopetition can be divided into two groups; exploitative; concerned with improving existing business opportunities and explorative; which involves value creation for new business networks. Market expansion and innovation pertain to explorative motives, whereas exploitative reasons concentrate on cost reduction through the achievement of synergies or scale effects, reduction in insecurity in the supply chain and reducing investment costs. The compilation of competitive advantage through an increase in competitiveness and market power can be a strong motive for coopetition. Nevertheless, it stems from realising explorative and exploitative reasons.

Song (2004), can be instrumental in categorising motives, as the factors can be divided into the two categories, based on the particular business situation, thus allowing organisations to determine the purpose of coopetition. It should be noted that while this study is not explicitly focused on the factors that motivate coopetition, understanding the motivators is instrumental in conceptualising the forms of coopetition (i.e. deliberate and emergent).

2.6 THE EVOLUTION OF COOPETITION RESEARCH

Strategic management literature has shown a significant shift in studies and practice in the recent decade, showing a move from a purely competitive mindset, grounded in organisational economics and resource-based views (RBV), to a more cooperative approach (Brandenburger and Nalebuff, 1996). The collaborative aspects gained its roots from extending the RBV outside the organisational boundaries by attempting to access the relational benefits obtainable from organisations and networks alliances (González-Benito et al., 2016; Bong et al., 2018; Clarke and MacDonald, 2019). More recently, scholars in strategic management are interested in reviewing the advantages of combining both the competitive and collaborative strategic

mindset (Brandenburger and Nalebuff, 1996; Bengtsson and Kock, 2000; Padula and Dagnino, 2002; Peng et al. 2012; Bouncken et al., 2015; Devece et al., 2019). As part of objective 1 (see page 26), this study reviews the evolution of coopetition in management literature by reviewing the opposing constructs of the relationship separately.

2.6.1 <u>The Competitive Perspective</u>

The competitive perspective has dominated many areas in management studies for a long time, including strategic management (Porter, 1980, Barney, 1986; Stonehouse, and Snowdon, 2007; Madsen and Walker, 2015), organisational economics (Wiilamson 1975; 1985; Pitelis, 2005; Clark 2012; Clark and MacDonald, 2019), marketing management (Borden, 1964; Coughlan, 1985; Gronroos, 2007; Armenia et al., 2018). According to Richardson (1972), the metaphor, 'an island in a sea of market relations' best captures the features of the competitive perspective.

Several studies investigate the competitive dynamics and interactions among competing organisations. For instance, Ferrier et al., (1999) studied the nature of inter-organisational competition while Hoskisson et al., (1999), investigated how organisations translated competitive dynamics into competitive advantages. Competitive dynamics which is based on Schumpeter's (1942) theory of creative destruction and Austrian Economics. It highlights the way organisations act and reacts to its competitive environment to attain a competitive edge (Ferrier et al., 2001; Chen et al., 2007; Clark, 2012; Clark and MacDonald, 2019).

The competitive perspective is primarily concerned with how organisations achieve and maintain a competitive edge over their rivals. Organisations develop competitive strategies to allow them to contend with their rivals to create or maintain a competitive advantage. Competition in management literature is described as a situation where several similar actors in a market struggle for limited resources to produce goods or services that meets the needs of similar consumers (Bengtsson and Kock, 2000; Hunt, 2007). The competition perspective focuses on the interdependence of individual organisations. McNulty (1968), describes the concept in terms of an exchange relationship occurring between existing and unchanging economic units. Whereas, in line with Schumpeter's reasoning, (Schumpeter 1962), competition is associated with internal industrial efficiency and the development of innovative technology, new sources of supply as well as types of organisation. McNulty (1968), adds that one of the downfalls of competition is its failure to recognise the effects of competition on one

economic unit on other groups, including the industrial structure. Additionally, Hunt and Morgan (1995), stress the passive nature of competition in management literature.

Competitive strategies were rationalised as either involving the internal or external parts of an organisation (Copeland, 1962; Porter, 1980; Chen et al., 1999; Clark and MacDonald, 2019). The external perspective positions competition within the Structure-Conduct-Performance (S-C-P) model of industrial-organisation economics. This model known as Porter's Five Forces shows that the structure of an industry can influence its state of competition and the structural dynamics within the industry (Porter, 1980; Porter and Kramer, 2002; Armenia et al., 2018). Additionally, Porter (1980), claims that these forces could demonstrate the average profitability of the industry. Within the internal perspective, authors emphasise the importance of developing the internal attributes of an organisation such as its resources and capabilities based on the RBV (Copeland, 1962; Wernerfelt, 1984; Barney, 1986; Stonehouse, and Snowdon, 2007; Madsen and Walker, 2015). RBV claims that the capabilities and resources of an organisation give rise to its competitiveness within an industry. Therefore, based on the diversification of resources, researchers attempt to understand the impacts of resources on organisational performance.

Moreover, Chen (1996), proposed the concept of market commonality and resource similarities to make sense of the pre-competitive tensions. Although, based on RBV, an organisation's advantage is dependent on it having strategic assets that are superior to its competitors. Therefore, the ability to sustain the edge is a function of the heterogeneity of such resources (Madhani, 2010). Notwithstanding, Chen (1996), suggests that three factors; awareness, motivation and capability (AMC), are responsible for providing the theoretical backgrounds for evaluating elements capable of influencing an organisations reaction to competition. It was argued that competitors could only react to a competitive move if they are; (1) aware of the move, (2) are motivated to respond and (3) possess the capacity to react (Chen et al., 2007; Liu and Hou, 2010; Chang and Chiu, 2016; Stadtler and Lin, 2017; Chen et al., 2018). Thus, they believe that understanding organisations AMC would influence competitive tensions.

Lado et al. (1997), further argues that competition provides economic advantages since it motivates innovation and encourages the efficient allocation of scarce resources. However, Dagnino (2009), argues that competition encompasses a zero-sum orientation. It assumes that economic value creation occurs within an organisation, claiming that IO interactions are responsible for the distribution of economic values. Therefore, organisations may be unaware

of the opportunities to realise positive-sum benefits through effective collaboration (Kanter, 1994).

Furthermore, Lado et al. (1997), maintains that structuring IORs as a zero-sum; would encourage competitiveness, which would make organisations protective of their resources, capabilities and core functions. Thus, making cooperation difficult or increase the risk of opportunistic behaviour (Williamson, 1985). It is, therefore, putting organisations at the risk of the learning race, which occurs when organisations seek to absorb the competencies of its partners while protecting their competitive capabilities (Kale et al. 2000). As a result, Quintana-García & Benavides-Velasco, (2004), discovered that having a purely competitive behaviour provides temporary gains and organisations with this view are unable to maintain a sustainable competitive advantage.

Within the study of competition dynamics, there is an implicit vies that some competitors are more suited to engage in competition than others. This difference in competitiveness allows differential growth and profit rates among organisations in an industry. This view suggests that longterm competitive behaviours can lead to a monopolistic position for the organisation in a sector, as opposed to a state of perfect competition (McNulty, 1968). According to Park (1998), the Schumpeterian, or neo-Austrian, view competition as a rivalry process existing among organisations where only the fittest competitors survive. The classical economists perceive competition as a behaviour concerned with pricing, whereas Schumpeter claims that for an organisation to retain competitive advantage, innovation and new product development should be prioritised. Therefore, the ability to innovate, create and invent can separate a successful organisation from an unsuccessful one and allow the creation and retention of competitive advantage (Schumpeter, 1942). Based on the Schumpeterian tradition, the dynamic model of competition views the nature of competition along dimensions of intensity, hence intense competition is considered to be the key defining factor for motivating firms to innovate and upgrade their competitiveness (Bengtsson and Kock, 2000).

The summary of the competitive theoretical framework are as follows:

1.   Economic value creation occurs within the organisation, while IORs influences the distribution of the value created. From the vertical viewpoint, the price of exchange explains the part of economic value retained by the supplier and the part of economic value allocated to the client. While the horizontal perspective focuses on the results from the allocation of customers' preference among competitors.

2.   Competition is based on a zero-sum game, since the success of an organisation, implies the loss defeat of other organisations.

2.6.2 <u>The Cooperative Perspective</u>

According to Newton (2016), the ability to make joint decisions for mutual benefits may have evolved among the ancient population, despite their limited reasoning capabilities, suggesting that collaboration is an essential aspect of human interaction. Despite its long history, the interest in collaboration increased after the realisation that organisations can still achieve added value by collaborating with other organisations (Axelrod and Hamilton, 1981; Taylor, 1987; Child et al. 2005; Rand and Nowak, 2013; Wang et al., 2018). As a result, organisations focused on developing relational advantages with other firms, especially those that possess the capabilities to compete effectively in the evolving business environment (Ireland et al., 2002; Child et al. 2005; Wang et al., 2018). Through cooperation, an organisation can make up for its lack of resources or competence by collaborating with other organisations that can provide the missing resources (Taylor, 1987; Child et al., 2015; Wang et al., 2018).

Inter organisational collaborations in their many forms; joint ventures, partnerships, strategic alliances, networks (Beamish and Berdrow, 2003; Osborne, Williamson and Beattie, 2002; Grant and Baden-Fuller, 2004; Sydow and Windeler, 2003) have been extensively researched from a wide range of disciplinary bases, including several, such as geography and politics, which do not relate directly to management or organisation studies. Even within the realm of management and organisation studies, the subject is studied from a rich diversity of theoretical perspectives, including mid-range theorising grounded in psychology (Gomes et al., 2005), sociology (Gustavs and Clegg, 2005; Larsson et al., 2003) or economics (Nguyen and Meyer, 2004), as well as theoretically promiscuous approaches such as institutional theory (Steensma et al., 2005; Teague, 2005).

The collaborative perspective presents the business environment as a composition of interdependent networks of organisations entangled in complex relationships with other organisations (Axelrod and Hamilton, 1981; Dyer and Singh, 1998; Cozzolino and Rothaermel, 2018). This form of alliance allows organisations to have access to resources or skills that may have been unavailable to them, to create new opportunities — thus creating an advantage for the organisation (Ireland et al., 2002).

Lado et al. (1997), discovered that it is not uncommon for organisations in collaborative interactions to exhibit rent-seeking behaviours, where they strive to obtain value and provide little or no value in exchange. However, Dagnino (2009) claims that economic value creation in a cooperative endeavour is based on the positive-sum game, where organisations seek to be engaged in a mutually beneficial relationship. Thus, a collaborative effort cannot be successful if the organisations involved are not obtaining value from the alliance.

Furthermore, for organisations to achieve a collaborative advantage, they need to collaborate within a trusting and committed environment ((Kanter, 1994). A trusting environment can minimise the risk of opportunism in a collaborative alliance, because trust can generate economic rents, e.g. providing mechanisms for social control and reducing transactional costs Lado et al. (1997). Authors argue that another factor that can reduce the risk of opportunism in a collaborative alliance is reciprocity (Dagnino, 2009; Matthews and Harris, 2018; Schweinfurth and Taborsky, 2018).

Notwithstanding, there are still some limitations to engaging cooperative endeavours. Frank (1988), observes that the true intentions of some organisations may be difficult to understand as opportunistic partners may be difficult to differentiate from genuinely trustworthy partners. Besides, it was observed that collaboration increases mutual commitments of unique and specific resources to the cooperative efforts, which, in turn, aggravates strategic inflexibility (Bresser and Harl 1986; Barkley and Henry, 2001; McQuaid, 2010; Daroń, 2017; Meschi et al., 2018). Moreover, it is believed that external reliance of organisations on other firm's resources can be detrimental to the organisation's performance as it makes them vulnerable to external elements or isolating them from relevant information that exists outside their network (Dagnino, 2009). Consequently, although the cooperative mindset is essential to create collaborative benefits, it may be not enough for achieving sustained superior performance and viability.

2.6.3 Collective Competition VS Competitive Collaboration (Coopetition Terminologies).

As described in previous sections, the competitive and cooperation constructs were traditionally viewed as opposite ends of a single continuum (Quintana-García & Benavides-Velasco, 2004). The relationship dynamics between the constructs were also studied separately, based on the argument that integration would threaten each dynamic (Bengstsson and Kock, 2000). Management scholars realised that integrating the two juxtaposing concepts may be advantageous, which led to the conceptualisation of another form of IOR. As this form of IOR

gained popularity, studies within alliances and competitive dynamics increased, although, using different terminologies such as 'collective competition', 'competitive collaboration' or even 'cooperation with rivals' depending on the focus of their study (Gomes-Casseres, 1994; Chen, 2008). Alliance literature views the construct of collaboration among competitors as a zero-sum approach, adopting an opportunistic perspective Transactional Cost Economics (TCE) framework. For instance, Hamel et al. (1989), referring to the construct as competitive collaboration, reviewed how to obtain more value than the other partners in the relationship. Subsequently, Hamel (1991) reasons that this form of relationship results in a learning race, where each firm strives to obtain more knowledge than their partners before the termination of the alliance — thus implying a zero-sum game between collaborators.

Similarly, Park and Russo (1996), discovered that value appropriation in joint ventures is increased between direct competitors. Collaboration among competitors has also been studied in competition literature. Notably, Ketchen and Snow (2004) include coopetition in a competitive dynamic study, while Chen (2008), discovered that competition-based coopetition adopts competitive attributes (e.g. industry structure and inter-firm competition to predict outcomes (e.g. intensity, duration, organisational learning among partners) of collaborative efforts (e.g. JV).

The issue is that there are various studies on coopetition, but use different terms to conceptualise the construct, even after, the introduction of the coopetition term. Therefore, there may be confusion about the differences between coopetition and other alliances such as horizontal alliance or even collective competition. Hence, scholars developed a framework for classifying collaborative relationships between competitors. Burger et al., (1993), referred to alliances between competitors within an industry as a horizontal alliance, distinguishing it from vertical alliances which occurs between organisations in adjacent stages of a value chain (Harrigan, 1988). Hence, according to Harrigan (1988), JVs are considered vertical if buyer-seller relationships are created between the owner and the venture, and horizontal if similar strategic activities link them. The second useful classification which supports implicit coopetition theory, suggests that organisations, that contribute similar resources to achieve scale advantages is categorised as scale alliance, while the contribution of complementary resources to attain differential advantage is referred to as link alliance (Dussage et al., 2004). In addition, Luo et al. (2007), suggests that organisations can form alliances with their competitors to accomplish both competitive and collaborative benefits.

Therefore, the coopetition construct has been studied in both competitive and collaborative literature and can aid in advancing the understanding of coopetitive dynamics, by drawing from the existing studies.

2.6.4 <u>The Coopetition Perspective</u>

Yami et al., (2010) described coopetition as a non-conventional, paradoxical and unorthodox approach to IOR because it combines two contradictory concepts. Although, coopetition researchers maintain that it is an evolving strategic perspective possessing the capabilities to combine and outperform the advantages of the traditional strategies and encourage organisations to adopt the strategy (Bradenburger and Nalebuff, 1996). Similarly, Chen (2008), observes that, despite the competition and collaboration perspectives being essential in the overall organisational strategies, researchers have not fully grasped the interrelationships that can occur between the constructs and its inherent benefits. Therefore, this study seeks to dig deeper into the coopetitive construct, by reviewing its nature, recurring themes and impacts on organisations.

2.6.4.1 *A Scan of Related Literature*

The coopetition concept has been studied in various management fields, following the foundational works of Brandenburger and Nalebuff (1996) as well as Bengtsson and Kock (2009). The literature on coopetition offers several characteristics of the construct.

First, coopetition was described as a multi-level construct consisting of at least three levels (inter-firm, intra-firm and network levels) (Bengtsson et al., 2013). Coopetition literature focuses on inter-firm level alliance and pays little attention to network-level and intra-firm level coopetition (Luo, 2005; Gnyawali et al., 2006; Peng and Bourne, 2009; Bouncken et al., 2015; Devece et al., 2019).

The conceptual development of the coopetition construct has progressed significantly since its initial conceptualisation (Brandenburger and Nalebuff, 1996; Bengtsson and Kock, 2000; 2009; Gnyawali et al., 2006; Peng and Bourne, 2009; Dagnino and Padula, 2009; Bouncken et al., 2015; Devece et al., 2019). The progress in development follows several calls to expand the nature of coopetition theoretically (Bengtsson and Kock, 2000; Luo, 2005; 2007). In developing the coopetition, a differentiation of the construct was made based on the number of

rival organisations and value-adding activities in the relationship (Dagnino and Padula, 2002). Luo (2007), typifies coopetition into four main categories based on the intensity of the alliance; contending, isolating, partnering and adapting situations. Similarly, Gnywali et al., (2008), indicates that the intensity of a coopetitive relationship increases when the competitive and collaborative elements coincide, as opposed to when they occur in separate time frames.

The subjects examined in coopetition literature are in three categories; the drivers, the context and the outcomes (Gnywali et al., 2008). Although coopetition literature acknowledges the main drivers for coopetition (e.g. government regulations, market condition) (Padula and Dagnino, 2007; Walley, 2007; Peng and Bourne, 2009; Bouncken et al., 2015; Devece et al., 2019), limited studies are investigating the coopetition drivers and its implications. From the contextual perspective, coopetition has been applied to explain various relationships and phenomena, including supply chain relationships, firm-government (or broad stakeholders) relationships, and collaboration with direct/indirect competitors. For instance, Luo (2007), suggests that coopetition can be applied to study the relationship between multinational companies (MNC) and their host governments.

Finally, in the study of the outcome of coopetition, scholars (e.g., Lado et al., 1997; Bengtsson et al., 2010; Bengtsson and Kock, 2014; Lindström and Polsa, 2016; Kraus et al., 2019) conceptually address the performance implications of coopetition. However, fewer studies focus on the empirical aspect of coopetition (Walley, 2007; Bengtsson and Kock, 2014; Devece et al., 2019). Only a few studies have dealt with financial performance (Luo, Rindfleisch, & Tse, 2007; Ritala et al., 2008; Baierl et al., 2016; Chen, 2019; Hennig and Malmsten, 2019), innovation performance (Quintana-García & Benavides-Velasco, 2004; Park et al., 2014; Bouncken et al., 2016; Estrada et al., 2016; Runge et al., 2019), JV stability (Park & Russo, 1996; Park, 2011; Park et al., 2014; Vanyushyn et al., 2018), and competitive behaviour (Gnyawali et al., 2006; Park et al., 2014; Gnyawali and Ryan Charleton, 2018; Czakon et al., 2019). With limited empirical studies and some inconsistent results, however, there is a great deal of ambiguity concerning the effects of coopetition on firm performance. More coopetitive themes would be discussed to help broaden the view and understanding of coopetition regarding, its typologies, paradoxes, management and tensions, including its effects on organisational performance.

2.7 COOPETITION THEMES
2.7.1 Paradoxes and Tensions in Coopetition

Since the introduction of coopetition to management literature, there has been an exponential rise in the interest of both academics and industry professionals in the concept. The increase in interest is attributed to the inherent benefit the concept offers to the individual firm, the SC and the industry (Bradenburger and Nalebuff, 1996; Bengtsson and Kock, 2000; Luo, 2007; Gnyawali and Park, 2009; 2011; Wu, 2012). However, despite this growing popularity, it has been observed that there are several opportunities to expand the knowledge, particularly regarding its materialisation, management and its nature (Raza-Ullah et al., 2013; Bouncken et al., 2016; Devece et al., 2019). For instance, there is no clear consensus about how to manage the tensions in a coopetition relationship. Gnywali and Park (2011), established that tension in a coopetition alliance is inevitable, due to its paradoxical nature and the drivers for the alliance may differ between the coopeting parties (Raza-Ullah et al., 2014).

Several studies have explored the tensions in coopetition relationships. For example, Park and Ungson (2001), stresses the importance of studying coopetition through a paradoxical lens, since the strategy encourages joint efforts between rivals. They added that the relationship mismanaging the tensions could result in managerial complexities which can affect the outcome of the alliance — therefore substantiating the need to review how to manage the tension in the relationship effectively.

Raza-Ullah et al. (2014), presented two contradictions responsible for the paradoxical nature of the coopetition strategy. The first contradiction of coopetition, as reported by Brandenburger and Nalebuff, (1996), is joint value creation versus private value creation. This contradiction is concerned with balancing the individual goals of an organisation with the mutual goal of the other parties. The particular focus is on resource and knowledge sharing, and allocation, involuntary information leakage, mainly since the motives may be underhanded to obtain sensitive information (Hamel et al., 1989; Khanna et al., 1998; De Rond & Bouchikhi, 2004; Luo, et, 2008; Raza-Ullah et al., 2014; Czakon et al., 2015; Christ et al., 2017; Fernandez et al., 2018). Since the contradiction leads to knowledge sharing/protection dilemma, Bouncken and Kraus (2013) recommend that organisations ensure that their internal maturity outweighs the strength of its external boundaries before engaging in a coopetitive endeavour to avoid opportunism.

The other contradiction that can occur from a coopetitive relationship is a long-term vs short-term orientation of the organisations. As Das and Teng (2000) argued, while one of the competitors may commit to a coopetitive relationship on a long-term basis, the other may behave deviously for short-term gains. The inability of partners to judge the long-term vs short-term motives of potential coopetitors is a major discouraging factor in the decision to fully collaborate in such relationships.

To emphasise boundaries in coopetition, Raza-Ullah et al., (2014), demonstrates that different contextual factors generate forces to create internal and external boundaries of paradox in coopetition. While the internal boundaries dwell on the differences between the two contradicting elements, the external boundaries unify these elements. It is also important to note that these boundaries are formed concurrently and are the prerequisites for the materialisation of a paradox. Hence, these boundaries are necessary conditions for the materialisation and sustenance of paradox in coopetition. Since, this notion has been studied extensively, with the use of various terminologies, to avoid confusion, (Table 2.1) presents the differences between paradox and similar organisational tensions.

Organisational Tensions	Characteristics
	Paradox Contradictory yet interrelated elements (dualities) that exist simultaneously and persist over time; such elements seem logical when considered in isolation, but irrational, inconsistent, and absurd when juxtaposed. **Dualities (A and B)** — Opposites that exist within a unified whole: - internal boundary creates distinction and highlights opposition. - external boundary encourages synergies by constructing the unified whole.

	Dilemma Competing choices, each with advantages and disadvantages. Paradoxical when options are contradictory and interrelated such that any choice between them is temporary and tension will resurface.
	Dialectic Contradictory elements (thesis and antithesis) resolved through integration (synthesis), which, over time, will confront new opposition. Paradoxical when elements are both contradictory and interrelated. Because synthesis stresses their similarities, neglecting valued differences, integration is temporary. The need for different qualities persists such that synthesis gradually favours one over the other (i.e., C and D retain core characteristics of A and B, respectively).
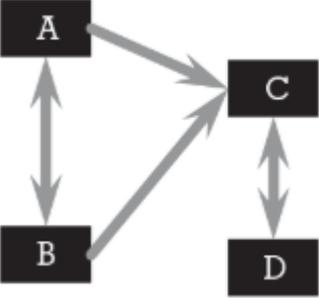
Table 2.1: Distinguishing among organisational tensions

(Source: Smith and Lewis, 2011, p. 387).

Das and Teng (2000), from a dialectic viewpoint, differentiate competing forces based on three notions; short-term vs long-term, rigidity vs flexibility, and cooperation vs competition. They argue that this notion can lead to internal tensions and as a result, cause instability, which can terminate the alliance. Subsequently, De Rond and Bouchkhi, (2004) identified additional sources of tension in inter-organisational engagements (Figure 2.8), and divided them into four categories, i.e. their performance, organisation, belonging (identity) and learning, according to the activities and elements in organisations (Lüscher and Lewis, 2008).
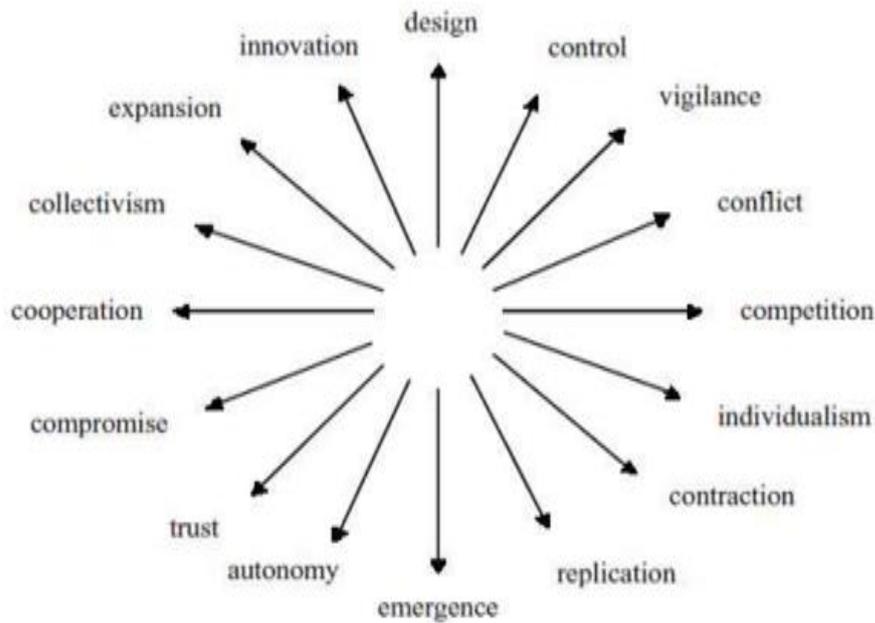
Figure 2.8: Potential Sources of Dialectical Tensions in Alliances

(Source: De Rond and Bouchikhi, 2004 p.66)

From Figure 2.8, De Rond and Bouchikhi, (2004) represents the various tension in opposite directions. For example, cooperation and competition represent organisational tensions. This categorisation of strains is crucial for this study. Besides the apparent tensions that exist between collaboration and competition, additional tensions applicable to this study can be identified (e.g. trust vs vigilance and emergence vs design) and would be reviewed further in the research. It should be noted that some authors have discussed the balancing of these dialectical tensions, for instance, Astley and Fombrum, (1983) covered the individualism vs collectivism pair, Tracey and Clark (2003), discussed replication vs innovation, conflict vs compromise was investigated by De Rond and Bouchiki, (2004).

In addition, paradoxical constructs can be categorised according to directions (vertical and horizontal) and time (diachronic and synchronic) dualities (Table 2.2) (Ford and Backoff, 1988). For instance, paradoxes can arise from the breakdown of a diachronic duality into a synchronic duality or from a diachronic and vertical duality. Based on this, Clarke-Hill et al., (2003), realised that the coopetition paradox arises from the breakdown of the diachronic duality into a synchronic one, resulting in tensions in the relationship. These tensions arise because of the relationship between contradicting logics that characterises coopetition

occurring at various levels, and its outcome depends on the manner it is managed (Tidström, 2014).

		Directional Dualities	
		Horizontal	Vertical
Time Dualities	Synchronic	Same Level	Different Level
		Same Time	Same Time
	Diachronic	Same Level	Different Level
		Different Time	Different Time

Table 2.2: Forms of Dualities

(Source: Adapted from Ford and Backoff (1988))

Regarding the dealing with tensions in a relationship, Poole and Van de Ven (1989), suggests four ways to respond to tensions in relationships. They propose that tensions should be (accepted) implying that, the dualities and elements should be separated, to acknowledge the difference between them. They also recommend that opposing forces should be allocated across various units (spatial separation); dealing with one at a time (temporal separation), and, (synthesis), seeking a view that accommodates the opposing poles. This typology aims to encourage the acceptance and resolution of the tensions in relationships.

Subsequently, Das and Teng (2000) encourage a balancing strategy where neither of the contradictory forces dominates over the other. They claim that when there is a balance, the strength of competing forces is at similar levels (high-high or low-low). When partners achieve a balance between all these pairs of competing forces, the alliance will be stable and will achieve its objectives. When one force is powerful enough to dominate over its competing one, the alliance will turn into either a merger, acquisition or lead to the dissolution. Although, this argument has been criticised for attributing a higher value to stability than change by indicating that partner should balance the contradictory forces that may unsettle the status quo. De Rond and Bouchikhi, (2004), believe that Das and Teng's (2000), contradicts the dialectical perspective by giving normative assumptions as to which states of social phenomena are better or more desirable than others. Based on the above typologies (management and balancing), this study would review tension management and its influence on coopetition success.

Another typology stresses the importance of conflict management views in managing coopetitive tensions (Tidström, 2009). According to her, the tensions in coopetition can be

developed into, operational, normative and strategic tensions, and positioned at three levels: organisational, relational and external (suppliers, salesmen and institutional) (Figure 2.9). Tidström (2009), believes that organisational level conflicts could either be operational or normative, relational level conflicts are normative or strategic, while at the external level, there are several third actors affecting conflict, i.e. suppliers, salesmen, customers and political actors.
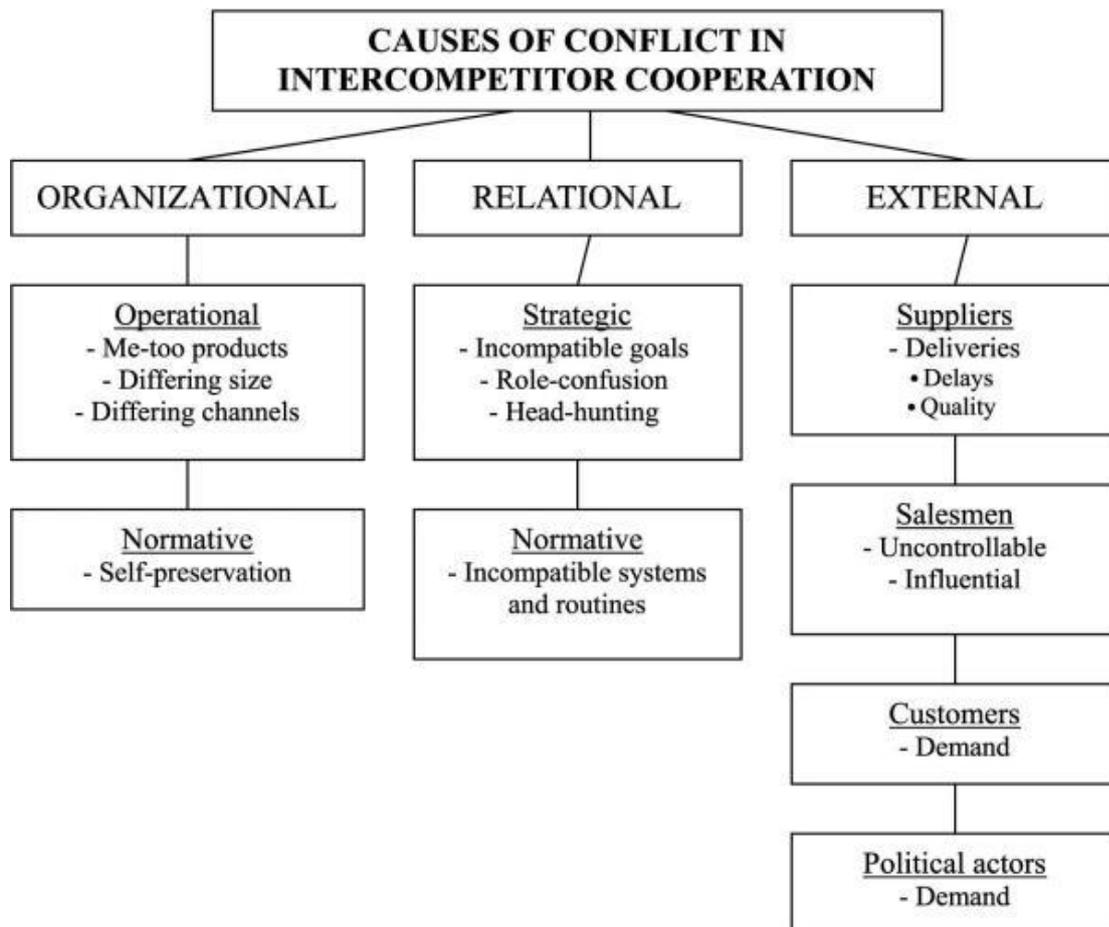
Figure 2.9: Causes of tensions in coopetition

(Source: Tidström, 2009 pg. 514)

Therefore, it can be implied that the type of cooperation that exists between competitors either (less or more collaboration or voluntary or forced cooperation) can explain the kind of conflicts that can arise.

Consequently, Tidström (2014) proposes three styles for tensions management: collaboration, competition or avoidance. The typology is based on the findings of Bengtsson et al. (2010) study comparing the form of tension management technique with the nature of the alliance.

Where the cooperation is high, and the competition is low, the three tensions management styles can be mobilised based on the nature of the tension. The collaboration was utilised to manage tensions relating to field activities. These tensions emerged when two of the coopeting organisations decided to refocus their activities to their core competencies, i.e. transform coopetition from horizontal to a vertical one. The partners faced suspicions of the requirement that a company had to stop manufacturing and selling its product to its customers. Hence, collaboration removed doubts and transformed the situation into a win-win one. Lüscher and Lewis, (2008), proposed a similar process, stating that collaboration was utilised to make sense of the coopetition paradox, while partners that are incapable of managing the paradox moved to competition to resolve conflicts. The study found that most of the tensions in coopetition were resolved through either the competition or avoidance conflict management style. This finding suggests that neither acceptance nor resolution or synthesising of the competing forces was at play in managing tensions. This form of tension management is therefore positioned within a dialectical tradition where one force dominates the other, in line with Das and Teng, (2000)'s assertion.

Coopetition tensions can also appear at inter-organisational (IO), intra-organisational and inter-individual levels for various causes (Fernandez et al., 2014). They suggested different strategies to address the tensions based on their roots. The tensions at the IO level were strong and intense, owing to the dilemma between value creation and value appropriation. Managing this form of tension is limited to a third party (two institutional actors), playing a mixed role which resulted in either intensifying or reducing the tensions. The third-party was used to organise and coordinate the coopetition endeavour. Intra-organisational level tensions were caused by the dilemma that occurs between combining two distinct industrial approaches, and the need for protection and sharing. Finally, at the inter-individual level, tension appears between individuals in a team, as members were from competing organisations, they could not see each other as partners. Fernandez et al., (2014)'s investigation showed the existence and persistence of coopetitive tensions at different organisational levels and proved that the integration and separation principles could be combined to manage coopetition tensions (Figure 2.10).
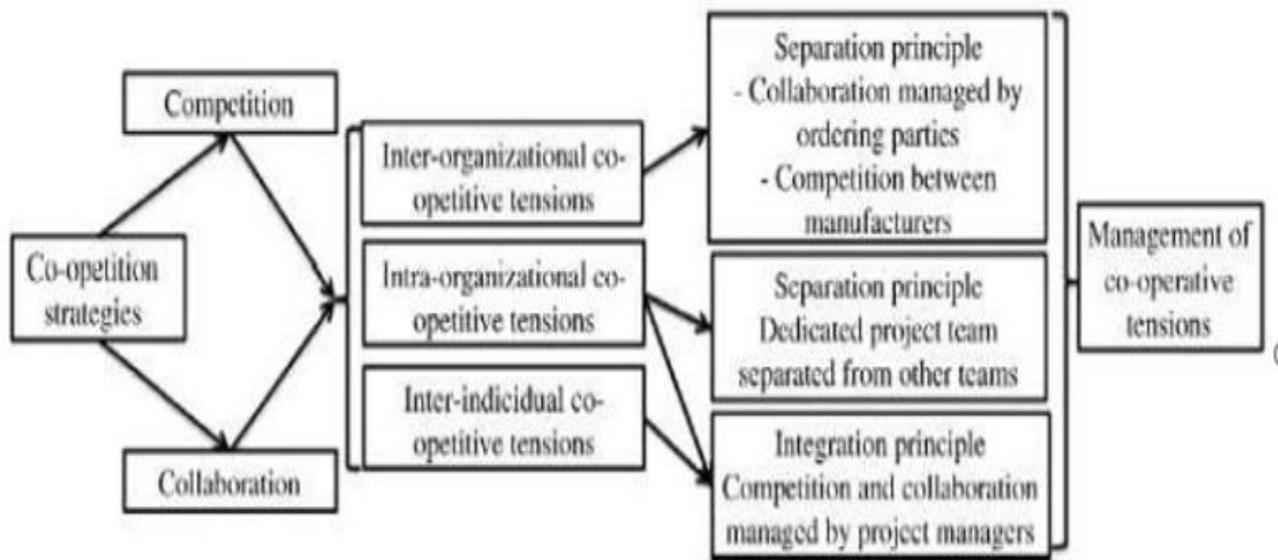
Figure 2.10: Management of tensions in coopetition (Fernandez et al., 2014 p.232)

Drawing from Fernandez et al. (2014)'s stance, regarding the use of a third party to manage coopetition, several questions arise which this study aims to answer, for instance, who are the members in the third party, since selecting members from within the coopeting organisations can result in inter-individual tensions.

Similarly, if an independent third-party organisation is used to organise and manage a coopetitive relationship, it could introduce another for of inter-organisational tensions among the coopeting organisations. Another question regarding integration and separation is the choice between these management strategies dependent on the activity being collaborated on or the location of the activity in the value chain? Based on the above typologies, this study would review tension management and its influence on coopetition success.

2.7.2 Coopetition Drivers in IORs

As mentioned in Section 2.5, one of the primary themes in coopetition studies is identifying the reasons and motives for coopetition. This section focuses on the factors that drive coopetition. However, since there are limited studies on coopetition drivers in management literature, factors that drive IOR would be reviewed and compared to coopetition.

With regards to the formation of IORs, Oliver (1990) highlights six determinants of relationship formation based on various theoretical approaches such as TCE, social capital. These determinants are; necessity, asymmetry, reciprocity, efficiency, stability and legitimacy (summarised in Table 2.3)

Determinants	Characteristics
Necessity	Establishes IORs to meet necessary legal or regulatory requirements (i.e. government regulations, professional regulatory bodies).
Asymmetry	IORs are motivated by the potential to exercise power over other organisations or their resources. There is an imbalance of power, which could be influenced by organisational size.
Reciprocity	IORs to pursue common or mutually beneficial goals or interests. It emphasises cooperation, collaboration, and coordination rather than domination, power, and control.
Efficiency	IOR is prompted to improve the internal input-output ratio. It is useful to improve efficiency if a firm anticipates increases in return on assets or reductions in unit costs, waste, downtime, or cost per client.
Stability	IORs are formed to enhance stability (predictability), used as a coping mechanism to forestall, forecast or absorb environmental uncertainties.
Legitimacy	IORs are formed to increase legitimacy. Can be used to improve reputation, image, within its environment. Organisations aim to interact with other firms with a higher level of legitimacy.

Table 2.3: Determinants of relationship formation

(Adapted from: Oliver, 1990)

Oliver, (1990), stressed that besides necessity which occurs based on mandates, the determinates occur voluntarily to address specific needs of organisations from its external environment. Notably, even though each determinant provides sufficient basis for IORs, more than one determinant can influence IOR choices.

Similarly, to understand the dynamics of partners selection in IORs, Gulati and Gargiulo (1999), combined resource dependency theory (RDT) to determine if the organisation should engage in IORs, and social network theory to decide on potential partners. Primarily, organisations interact with one another to manage their dependence on other organisations in

their business environment, to mitigate the uncertainties generated by dependence. Pfeffer and Salancik, (1978), argued that resource-dependency is a process that mediates between environmental demands and organisational actions. Therefore, when choosing collaborative partners, organisations should identify the competencies, need, and reliability of the potential partners; these would aid the creation of stable, preferential relationships. Thus, Gulati and Gargiulo (1999), suggests that the interdependency; the amount to previous direct (relational embeddedness), and indirect (structural embeddedness) including the combined network centrality (positional embeddedness) improves the probability of a relationship between organisations. They also noted that, even though network differentiation (maturity) positively influences the chances of relationship formation, the transformation of the emerging network into mature one will reduce the role played by strategic interdependence and enhances the function of combined centrality on relation formation probability. One explanation of the increasing maturity of the network enables organisations to use this network as a source of information for their future partnerships, which mitigates the effects of exogenous interdependence on the formation of a new relationship.

Subsequent studies on the formations of IORs found that neither the resource needs of the organisations nor its social structure is significant in predicting a relationship. Instead, they are linked to inducements and opportunities (Ahuja, 2000). They added that possessing the three tenure related advantages (commercial, technical and social capital), influences the IOR formation inducements and opportunities. Additionally, the innovativeness of the organisations creates an added benefit for IOR formations in organisations lacking the tenure-based advantages.

While studying the multifaceted nature of coopetitive relationships, Dowling et al. (1996), adopted resource dependency and transactional costs theories to review the antecedents of IOR formations. They discovered that some external factors or structural characteristics such as concentration, interconnectedness and munificence (based on resource dependency theory), and some internal factors such as the importance of resources, asset specificity and opportunism (based on transaction costs), can result in the formation of a coopetitive relationship. Dowling et al., (1996), also realised that coopetitive relationships are more likely to occur in highly regulated and global industries, than in less munificent environments. Within the concentrated industries, organisations are more involved with a higher number and variety of suppliers and buyers who may also be competitors, while munificent environments tend increased conflicts and interdependence between organisations because of scarce resources in

the industry. Notably, the UK OG industry is highly concentrated, with many organisations competing for limited resources, which implies that coopetition can exist within the industry.

Time is also considered as a resource which could be scarce, particularly in hyper-competitive industries where the time needed for innovation or the design and generation of new components are time-sensitive. Here, making a competitor, a supplier may be a realistic alternative to maintaining a competitive advantage. This factor is consistent with Oliver (1990)'s necessity IOR determinate, where relationships are formed because of legal mandates. Resources are critical to an organisation, primarily if they represent significant percentages of their inputs or outputs on internal levels. The more specialised an asset or resource becomes, the higher the transactional cost and switching costs become, with regards to changing suppliers. These forms of assets make it difficult for organisations to find new suppliers, even if their supplier's strategy changes to become competitors. An example of this form of relationship is between tech giants, Apple and Google. Apple now relies on Google to provide a public cloud for data storage for its iCloud services (CNBC, 2018), while Google has become the default search engine for Apple's Siri (Boland, 2017). It should be noted that sourcing specialised assets from competitors can lead to opportunistic behaviours, seeing as the competitors can obtain information from the types of assets being sourced. Sourcing from a competitor can lead a firm to unintentionally, signalling its competitors when new product development is ongoing, thereby allowing the competing firm additional gains through opportunism.

There have been several studies attempting to uncover the rationale behind collaboration among competitors. For instance, Hamel et al., (1989), believes these relationships are useful to tackling common issues faced by the organisations such as regulatory changes, Tether (2002), suggested that competitors collaborate to set industry standards or learn about their competitor's competencies. Fjeldstad et al., (2004), claims that environmental factors such as the need for market penetration, encourages coopetition, while Gnywali and Park (2009), the high costs of R&D, the productions of short life cycle products (reducing time to market to attain added benefits during the short life-cycle from the products), technological convergence, the risks of new technologies drive collaborations among competitors.

Moreover, Carayannis and Alexander, (2003), revealed that organisations decide which competitors to collaborate with based on the traditional determinants related to relational strategies complementarities between partners, costs and risk sharing arguments, and similar

or overlapping resources. The meeting between these contextual and the specific characteristics of the organisations that results in the organisation's decision to engage in collaboration, which is in line with Ahuja (2000)'s argument that the formation of IORs is systematically related to inducements and opportunities.

Consequently, the coopetitive strategy would be adopted if the expected benefits are positive and outweigh the values that can be attained from other forms of IORs which may provide similar advantages (Borys and Jemison, 1989; Williamson, 1995). Arino and Ring (2010) also realised that fairness as well as expected value creation in the formation phase influences organisations' decision to engage in coopetition. In other words, coopetition partners need to be convinced that the expected value produced by the relationship is proportional to their contributions and that their partners will not diminish value from the relationship. These conditions are necessary for the formation of a coopetitive relationship.

Regarding the UK OGI, some of these drivers would come into play. Wood (2014), strongly encourages collaboration within the industry and organisations are offered incentives to collaborate (Oil and Gas UK, 2016); however, there are no strict government regulations for organisations to collaborate. Thus, removing necessity as a determinant for IORs in the industry. Therefore, it can be implied that organisations would collaborate with their competitors in the industry if they expect additional values to be attained, especially with regards to firm performance.

2.7.3 Impacts of Coopetition on Organisational Performance

This study aims to review the impacts of coopetition on organisational performance in the OGI. Coopetition literature identifies improvement in organisational performance as one of the benefits of engaging in a coopetition relationship (Gnywali et al., 2008). Therefore to understand the impacts of coopetition on performance, it is crucial to review Lado et al., (1997) categorisation of coopetition on the organisational level (Table 2.4).

		Competitive Orientation	
		Weak	Strong
Cooperative Orientation	Strong	*Cooperative Rent-seeking Behaviour*	*Syncretic Rent-seeking Behaviour*

		High cooperation + low competition. Organisations seek mutual benefits. Collective interests rather than self-interest are promoted. Relationships are fostered by value sharing and creation.	High cooperation + high competition. Positive sum orientation Organisations strive to balance the cooperative and competitive elements. Behaviour is based on endogenous growth theory of competition.
	Weak	*Monopolistic Rent-seeking Behaviour* • Low cooperation + low competition. • Organisations are interested in monopolising the market. • Collude to control market prices. • Lobby governments to enact regulations to curb competitive rivalry.	*Competitive Rent-Seeking Behaviour* • Low cooperation + high competition. • Organisations are willing to attain competitive advantage. • Zero-sum orientation • Organisations strive for higher performance. • Acquire and utilise scarce resources efficiently.

Table 2.4: Coopetition Rent-seeking Behaviours (Lado et al., 1997).

Consequently, Lado et al. (1997), realised that organisations that adopt syncretic behaviour are more likely to attain superior performance as opposed to the other three practices. They

explained that combining high levels of cooperation and competition creates economic rents, improves market growth and provides an avenue for knowledge creation and development. Despite the benefits of this form of coopetition, Lado et al., (1997), stresses the difficulty in managing these relationships, as maintaining a sustainable coopetitive relationship depends mainly on resource heterogeneity among the coopeting parties as well as organisations having suitable internal and external conditions. Additionally, Lado et al., (1997), explained that the more organisations that exist within an industry, the less opportunity for market growth as resources becomes scarce. Thus, syncretic coopetition offers added benefits by leveraging on the competencies of other organisations to create and improve value.

Regarding the difficulties involved in coopetitive practices, Hamel et al., (1989), suggests that organisations need to adopt some principles to overcome the challenges involved in combining collaboration and competition.

1. Organisations need to grasp its strategic objectives as well as the objectives of its potential partners to understand how it can influence their likelihood of success.

2. Organisations must acknowledge that conflicts would arise in the relationship and be prepared to work through and effectively manage the conflicting situations to attain their company objectives.

3. Organisations need to be cautious about strategic knowledge sharing, ensuring that internal boundaries are present when deciding the form of information that should be exchanged, while also monitoring what information their partners request.

4. Organisations should try to learn from its alliances by seeking to absorb knowledge even outside the confines of the relationship agreements and, also increasing the avenues to apply the new knowledge.

Moreover, Gnywali et al., (2008), discovered that proactive organisations with the resources, capabilities and competence to manage a complicated relationship and have coopetitive mindset have a higher chance of engaging in a successful coopetition endeavour. This leads to the question about the effects of SC flexibility on the outcome of coopetition.

Furthermore, while studying the effects of horizontal alliance on organisations' productivity and profitability, Oum et al., (2004), realised that while horizontal relationships have no

significant impact on an organisation's profitability, it has a positive association with the organisations' productivity. Whereas, a relationship with high cooperative elements positively influences the organisations' productivity and profitability. A similar study by Ritala et al., (2008), investigating the impacts of coopetition on organisational performance, revealed that a coopetitive relationship is beneficial when the organisation collaborates with some (not all) of its primary competitors. Peng et al., (2012), while studying coopetition in low-tech industries noticed a positive correlation between coopetition and organisation's improved performance, stressing that coopetition reduced the timeframe necessary for the organisations to attain the increased level of performance. These studies, therefore, prove that coopetition can increase an organisation's performance and productivity which this study is concerned with, as a practical application of coopetition in the OGI can aid in improving the productivity of these organisations.

Although it is difficult to have a comprehensive definition of an organisation's coopetitive performance, which can be evaluated by researchers to clarify the contradictory interaction between competition and collaboration, for instance, an organisation's performance is assessed as an isolated lease from a competitive viewpoint, while it is viewed as a relational rent of the organisations involved in an alliance from the collaborative standpoint.

It is crucial to acknowledge Eikebrokk and Olsen (2005) attempt to empirically study the theorised positive connection between coopetition and the success of e-business in SMEs. Although, they further pointed that coopetition has been conceptualised as an organisation's ability to partake in an alliance and assess it as the combination of factors related to the organisation's capability of sourcing alignment and external governance. Although, this view of coopetition does not consider the competitive aspect of the paradox.

2.7.4 Critical Coopetition Success Factors

As established in previous sections, coopetition is a strategy that combines two juxtaposing paradox to create added value for the parties. Since, the strategy combines two uniques elements, ensuring its success may not be straightforward. Walley (2007), warns that not all coopetitive relationships are successful, therefore stressing the need to identify success factors.

One of the success factors presented in coopetition literature is concerned with the mindset of the parties in the alliance. Bengtsson and Kock (2000), argue that a friendly mindset is critical

to ensuring that cooperation element of coopetition is successful, as hostility in the cooperation phase can cause tensions in the relationship where the parties become more invested in their personal gains than in the collective value creation that can be achieved from the relationship.

Levy et al., (2003), therefore suggests that organisations should separate the two significant stages of coopetition; the competitive and pre-competitive stages of the relationship to reduce the tensions in the alliance thus making the IOR easier to manage. Levy et al., (2003) sum that active management of the relationship is critical to its success, as, through active management, organisations can decide what information to share, with whom to share this information and under what conditions. Bengtsson and Kock (2000), agreeably, state that separating the stages of coopetition help prevent unintended knowledge and competency sharing, which may otherwise put the organisations at risk of opportunism.

Furthermore, Bengtsson and Kock (2000), added that proximity is another factor that determines success in a coopetitive relationship. According to them, proximity to the consumers plays a vital role in separating the cooperative and competitive elements of coopetition, arguing that collaborative endeavours occur further away from the end-users while the organisations then compete on activities closer to the consumers.

Zineldin (2004, p. 783), stresses the importance of motivation and strategic fit in ensuring successful coopetition. He added that for a coopetitive relationship to be successful, the partners need to meet five essential criteria;

- Strong motivation and willingness to engage in coopetition, and also have something valuable to contribute to the relationship (strategic fit), adding that a coopetitive relationship is more sustainable if the parties involved have a clearly identified source of competitive advantage.

- The need for interdependencies. Each partner should have complementary resources or skills that are advantageous to other partners, thus demonstrating the need for the relationship and proving the reliance and level of investments in the alliance.

- The partners also need to have a cultural fit. He suggests that possessing the right attitude would allow the partners to commit to the relationship and encourage sharing the necessary information and resources to ensure a beneficial outcome.

- Adequate organisational arrangements and institutionalisation. The relationship should be formalised, with each partner having clearly defined roles, responsibilities and

expectations. They should also put conflict resolution measures in place to ensure the alliance can handle disputes without declining the quality of the relationship.

- Finally, the partners need to integrate their activities and have some level of integrity. This integration would create an avenue for effective communication, to help minimise the risk of opportunism, and improve the process of transparency. The integrity ensures that partners do not take advantage of the relationship for private gains and encourages mutual respects among the partners, ensuring that they conduct their affairs honourably.

Zineldin (2004), further added that, because the dynamics of an IOR changes during the lifecycle of the relationship, as parties may interpret, re-interpret and react differently to the actions of their coopetitive partners, therefore stressing the need for similar organisational cultures. While Zineldin (2004)'s criteria seem logical, it may be difficult to assess the motives of other partners as organisations decide to engage in coopetition for varying reasons Raza-Ullah et al., (2014), which may be harmful to the relationship. Similarly, since the coopetition occurs for various reasons and in some cases, coopetition is forced strategy, Mariani (2007), the partners may not value the role of integrity as much as having a robust contractual agreement to protect their competitive advantage.

Consequently, Chin et al., (2008), postulated a hierarchical model of coopetition, drawing from Zineldin (2004)'s assertions (Figure 2.11), to enable organisations cope with the several tensions involved in the relationship and create a formal protection mechanism in the management of coopetition to allow the sharing of vital information and resources while avoiding the leakage of technological or core competencies.

Level 1: Goal — Successful Coopetition

Level 2: Category of factors — Management Commitment | Relationship Development | Communication Management

Level 3: Factors

1.1 Management Leadership

2.1 Development of trust

3.1 Information system support

Level 4: Sub-factors

1.1.1 Vision and Mission
1.1.2 Policy and Strategy
1.1.3 Resource allocation

2.1.1 Common goal
2.1.2 Adapting mutual organization culture

3.1.1 Data interchange
3.1.2 Effective coordination

1.2 Long-term commitment

1.2.1 Adapting mutual strength and weakness
1.2.2 Long term agreement
1.2.3 Periodical review

2.2 Knowledge and risk sharing

2.2.1 Knowledge identification

2.2.2 Effective knowledge sharing

2.2.3 Effective risk sharing

3.2 Conflict management system

3.2.1 Conflict resolution process

3.2.2 Conflict monitoring and improvement

1.3 Organization learning

1.3.1 Organizational motivation
1.3.2 Employee participation

Figure 2.11: Hierarchical Model of coopetition strategy management (Chin et al., 2008 p. 442)

Their model suggests that management leadership, long-term commitment, organisational learning, trust, knowledge and risk sharing, information system support and conflict management are critical in determining the success of a coopetitive relationship. The characteristics of the model were summarised in Table 2.5.

Category of Factors	Summary
Management Commitment	Management leadership, reflecting the extent to which management supports the implementation of coopetition strategy, which can be perceived through its mission and vision statement, willingness to allocate resources and put policies in place to promote coopetition all contribute the success of the coopetitive endeavour. Thus, potential partners can determine the outcome of a coopetitive attempt through the attitude of its management to the relationship. Furthermore, they believe that long-term commitment also

	benefits the relationship as responsibilities between partners become clearly defined.
Relationship Development	The two essential elements responsible for influencing relationship development are common goals and knowledge and risk-sharing. They also claimed that trust is also a vital element for relationship development. Trust in this regard was conceptualised as the thread that ties two distinct organisations with common goals and interests.
Communication Management	Conflict management and information system supports are the two essential factors in internal and external communication. The conflict management system is identified as a critical function in helping to maintain an intensive level of cooperation with competitors, which can balance the advantages and disadvantages of the relationship positively and minimise the sources of insecurity and uncertainty. Whereas, information systems exist within the supply chain to help a corporation create value. An effective information system could assist top managers in making the correct decisions and deal with conflicts in time by analysing timely and precise messages.

Table 2.5: Summary of critical coopetition success factors (Chin et al., 2008).

While contributing to the study regarding coopetition success factors, Gnyawali and Park (2011), argue that a coopetitive mindset, previous coopetition experience, and complementary resources are capabilities are the three factors that must exist for the benefits of coopetition to be attained, and therefore resulting in a successful coopetition strategy. In addition, Enberg (2012), develops a framework for knowledge sharing in a coopetitive relationship to minimise the inherent risks. He suggests that the parties involved in the relationship create a pre-determined work statement before the commencement of the relationship, which would allow the members produce a knowledge sharing and integration plan, thus preventing unintended information sharing. Similarly, Gnyawali and Park (2011), noted that a formal cross licencing

agreement helps create a balance between knowledge sharing and maintaining the organisation's uniqueness.

Ritala (2011), while investigating the factors that lead to successful coopetition, discovered that the business environment is critical to a successful coopetitive relationship. For instance, coopetition has more potential for success within a market with high uncertainties since risk and cost-sharing provides added value for the actors. Ritala (2011) also discovered that network externalities increase the chances for coopetition success, i.e., when the value of the offering increases along with the number of users.

Similarly, Petter et al., (2014), suggests another hierarchical structure for CSF (Figure 2.12) based on the level of interference and scope that exists amongst each group of success factors and on coopetition within a business network, by subgrouping them into (1) factors that condition systematic competitiveness and, (2) factors that condition the competitiveness of the network.
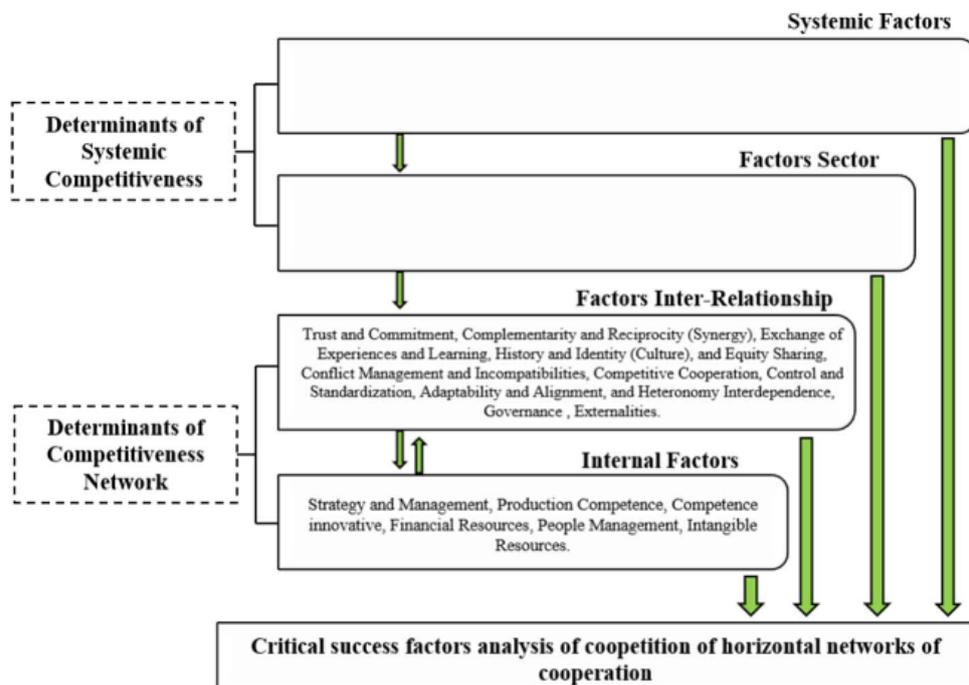
Figure 2.12: Coopetition structure in horizontal business networks. (Petter et al., 2014, p. 164)

Notably, a contractual agreement was presented as a vital coopetition success factor, particularly in cooperative relationships that occur among direct competitors (Ritala and Hurmelinna-Laukkanen, 2009; Hung and Chang, 2012). They argue that contractual

agreements are essential in enabling an organisation to maintain and protect its core competencies and business despite the cooperative efforts, which may otherwise be at risk with an integrated JV. Similarly, in an attempt to investigate how coopetition theory differs from practice, Klisonyte (2015), reviewed two separate cases of coopetition and realised that one of the critical factors to ensure a positive coopetition outcome is contractual agreements (Figure 2.13). Additional, Klisonyte (2015), found that prior training to align the cultures of the organisations and set expectations, transparency regarding the actual agenda for the relationship, trust by non-hesitation in revealing sensitive information for the advancement of the alliance, effective and efficient two-way communication, as well as setting rules and guidelines would ensure a successful interaction. This model is questionable, especially regarding the areas of trust and transparency. The dynamics of a coopetition alliance, suggests that an organisation should be protective of its competitive advantage and should hesitate before revealing sensitive information. Also, due to the risks of opportunism, the issue of transparency becomes debatable; however, in line with the model, potential coopetition partners need to be upfront about their expectations from the alliance.
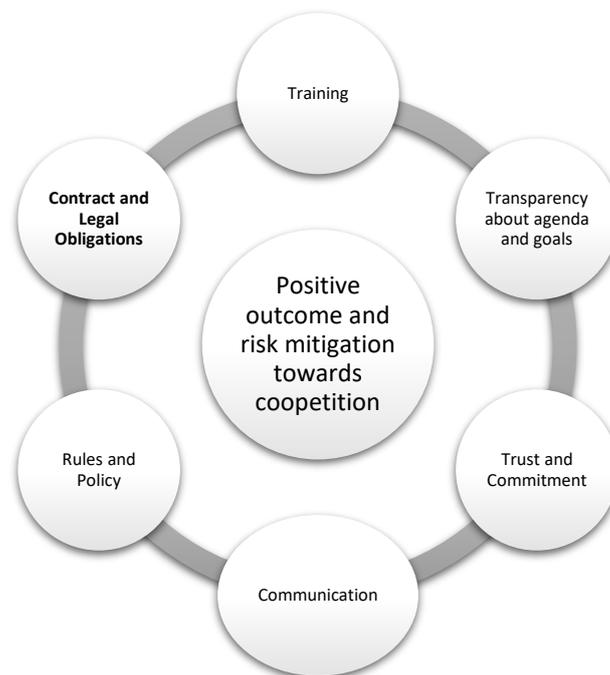
Figure 2.13: Characteristics of Coopetition Success (Klisonyte, 2015, p. 8).

Several studies attempting to rank and investigate the coopetition success factors (Chin et al., 2008; Ritala, 2012; Thomason et al., 2013; de Resende et al., 2017) exclude the importance of

contractual agreements in ensuring the success of coopetition. Most of these studies rank the development of trust as the most critical criteria in determining coopetition success. This study, therefore, posits that while trust is essential in a coopetitive relationship, a comprehensive contractual agreement is also as important in determining the outcome of a coopetitive endeavour. This study tests the proposition that trust alone is not enough to ensure a successful coopetition relationship.

Following the review of the evolution of coopetition literature and the coopetition themes, such as its typologies, drivers, its tensions and success factors, several questions have been raised, such as the characteristics of the two primary forms of coopetition formation, the deliberate and emergent, and what factors can ensure their success; the effective and most practical ways of managing coopetition tensions, the role of dedicated alliance function and the most effective way to control a coopetitive relationship (trusts or contracts). These emerging themes would be discussed in the following sections.

2.8 COOPETITION AND ANTI-COMPETITION

One of the primary concerns in coopetition studies is regarding its position and role in anti-competition laws. Authors have questioned the motives for coopetition, stating that it can be used as a smokescreen for cartel-like collusions. While studying the most suitable business model for coopetition, (Ornstein et al., 2015), discovered that organisations were hesitant to engage in the alliance for fear of strategy being confused for the illegal cartel collusion. Moreover, neoclassical economists view coopetitive alliance as anti-competitive collusion, with a potential to violate anti-trust laws (Levin and McDonald, 2006). This view follows from what Spicvack and Ellis, (1993), term as 'collusionary' behaviour, where firms create alliances to fix prices in a market or divide a market into territories to benefit each firm, or to create a monopoly in a market. This concern makes it necessary to discuss coopetition from a legal perspective, particularly in relation to anti-competition and anti-trust laws.

Anti-competitive behaviour which may affect trade within the UK is prohibited by Chapters I and II of the Competition Act 1998 (Vickers, 2017). Where anti-competitive behaviour may affect trade between EU member states, it is also prohibited by Articles 101 and 102 of the Treaty on the Functioning of the European Union (TFEU). The EU rules will cease to have any effect within the UK from 1 January 2021, but UK businesses with cross-border activities

within the EU will still be subject to EU competition law in respect of those activities, as well as domestic competition law in the EU member states (Jones, 2017).

UK and EU competition law prohibit two main types of anti-competitive activity: anti-competitive agreements (under the Chapter I / Article 101 prohibitions); and abuse of a dominant market position (under the Chapter II / Article 102 prohibitions) (Paha, 2016; Bradford et al., 2019).

- Anti-competitive agreements (Chapter I / Article 101)

Both the UK and EU competition law prohibit agreements, arrangements and concerted business practices which appreciably prevent, restrict or distort competition, or where this is the intended result, and which affect or may affect trade within the UK or the EU respectively (Jones, 2017; Caliskan, 2019).

Infringements of Chapter I or Article 101 can have severe consequences for a business as recorded by Caliskan (2019):

- firms engaged in activities can face fines of up to 10% of global group turnover;

- anti-competitive restrictions in agreements may be automatically void and unenforceable, and may lead to the entire agreement being unenforceable;

- firms also leave themselves exposed to actions for damages from consumers, customers and competitors – including mass actions – who can show the anti-competitive behaviour has harmed them; and

- individuals in the UK can face being disqualified from acting as company directors as well as risk prosecution under the criminal cartel offence.

Types of agreement within scope

Whether an arrangement is anti-competitive is assessed based on its objective, or its effect on competition, rather than its wording or form (Paha, 2016). This means that verbal and informal 'gentlemen's agreements' are equally capable of being found to be anti-competitive as formal, written agreements (Bradford et al., 2019).

Examples of the types of arrangement which are generally prohibited under Chapter I and Article 101 include:

- agreements which directly or indirectly fix purchase or selling prices, or any other trading conditions, for example, discounts or rebates;

- agreements which limit or control production, markets, technical development or investment, for example, setting quotas or levels of output;

- agreements which share markets or sources of supply; and

- agreements which apply dissimilar conditions to similar transactions, placing other trading parties at a disadvantage.

The prohibitions will not catch agreements between companies in the same corporate group.

Cartels

Cartel behaviour between competitors is the most severe form of anti-competitive behaviour under Chapter I or Article 101 and carries the highest level of penalties. A 'hardcore' cartel is one which involves price-fixing, market sharing, bid rigging or limiting the supply or production of goods or services. Individuals prosecuted for a UK cartel offence may be liable to imprisonment for up to five years and the imposition of unlimited fines (Caliskan, 2019).

In addition, individuals involved in international cartels, such as those involving activities in the US, could also face extradition and criminal prosecution under applicable national competition laws (Caliskan, 2019).

Exemptions

The fact that an agreement restricts competition does not mean that it is automatically prohibited unless it is a hardcore cartel. It may be that an agreement which falls within the scope of the prohibitions under Chapter I or Article 101 is excluded or exempted from the competition rules.

For example, an agreement which would otherwise be caught by Chapter 1 or Article 101 may be assumed to be harmless where the parties to it are not actual or potential competitors, or they have market shares sufficiently low that there can be no real effect on competition or trade within the UK or between EU member states. However, agreements which are deemed to restrict by the object, in particular, cartel behaviour, will almost always be found to infringe the competition rules regardless of market shares.

Other agreements may be exempted under a 'block exemption' – a group exemption, which automatically exempts certain agreements falling within its scope. Different block exemptions may apply depending on the nature of the agreement or the market sector concerned. For example, there are block exemptions available for vertical agreements, technology transfer agreements and research and development agreements (Paha, 2016).

Each sets out certain conditions which must be satisfied in order for the agreement to be block exempted. These conditions might include, for example, those relating to the market shares of the parties and the types of restriction contained within the agreement. A number of EU block exemptions have been carried across, with some minor modifications, into UK domestic law and will continue to apply under UK competition law after Brexit (Vickers, 2017).

Even if an agreement does not fit squarely within a block exemption, it is still not automatically unlawful or unenforceable. An agreement may also be individually exempted on the grounds that its beneficial effects outweigh the restrictions of competition. The evidential burden for satisfying the requirements for individual exemption is relatively high, and it is incumbent on businesses to ensure that they self-assess their compliance with the competition rules; it is not possible to apply for clearance from the competition authorities, except in minimal circumstances.

Abuse of a dominant market position (Chapter II / Article 102 prohibition)

Both UK and EU competition law prohibit businesses with market power from unfairly exploiting their strong market positions, known as an "abuse" of dominance. However, having a dominant position does not in itself breach competition law. It is only the abuse of that position that is prohibited (Paha, 2016).

Consequences of breach

Breaching Chapter II or Article 102 can have severe consequences for a business:

- firms that abuse their dominant position can face fines of up to 10% of global group turnover;

- conduct in breach of Chapter II or Article 102 can be stopped by court injunction;

- firms in breach of Chapter II or Article 102 also leave themselves exposed to actions from third parties who can show they have suffered loss as a result of the anti-competitive behaviour; and

- breach of Chapter II can result in individuals being disqualified from being a company director (Caliskan, 2019).

Type of behaviour within scope

To be in a position of dominance, a business must have the ability to act independently of its customers, competitors and consumers. Establishing if a company is dominant requires a complex economic and legal assessment of a number of elements but, as a general rule, if a business has a 50% market share or more significant, there is a presumption that it is dominant. However, dominance has been found to exist where market share is as low as 40%.

Article 102 requires dominance in a substantial part of the EU, but there is no requirement under Chapter II that a dominant position must be held in a substantial part of the UK, meaning that, in theory at least, dominance could be considered to exist in a relatively small geographical area of the UK.

Examples of behaviour that could amount to abuse by a business of its dominant position include:

- imposing unfair trading terms, such as exclusivity;

- excessive, predatory or discriminatory pricing;

- refusal to supply or provide access to essential facilities; and

- tying – i.e. stipulating that a buyer wishing to purchase one product must also purchase all or some of their requirements for a second product from the dominant supplier.

Exemptions

There is no equivalent to the exemption for anti-competitive agreements. However, a dominant company may be able to show that it has an objective justification for otherwise abusive behaviour in certain circumstances.

For example, a company may refuse to supply to a particular customer based on its low credit rating, which would amount to the protection of legitimate business interests and not, therefore, constitute abusive conduct under Chapter II or Article 102. It would only be when such behaviour goes beyond what is necessary to protect the business' interests that this could amount to an abuse.

Enforcement of competition law

EU competition law no longer applies in the UK after 31 December 2020 and the UK competition authority and courts will no longer apply it. However, EU competition law in force before that date, including the European courts' historical case law, will continue to apply in the UK as "retained EU law". This means that UK competition law will continue to be interpreted in accordance with pre-Brexit EU law and case law (Vickers, 2017). However, going forward, some UK courts will be able to depart from the retained EU law in certain circumstances (Jones, 2017).

The Competition and Markets Authority (CMA) is the principal competition law enforcement authority in the UK, though there are a number of sector regulators with concurrent powers to enforce competition law in their respective sectors (Paha, 2016). These include the FCA for the financial services sector, Ofgem for the electricity sector and Ofwat for the water sector (Paha, 2016).

The CMA and sector regulators have significant powers to investigate suspected anti-competitive behaviour. Those powers can be used to enter and search business and private premises with a warrant in what is known as "dawn raids". They also have the power to impose fines on businesses found to have infringed competition law. Criminal sanctions for the most severe breaches of competition law are prosecuted by the CMA, together with the UK's Serious Fraud Office (Paha, 2016).

As mentioned above, the collaboration between competitors was perceived as a strategy, that is detrimental to competition through the collusive actions and other anti-competitive behaviours (Vonortas, 2000). As such, several studies have focused on investigating the connections between coopetition and the risks of anti-competition. A general line of reasoning (Vonortas 2000) suggests that this kind of collaboration is collusive. For instance, the U.S. Sherman Act clearly defined the basic view of anti-trust regulations that any "contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several states, or with foreign nations, is declared illegal." The legal view is that price-fixing always brings inflated prices and reduced outputs; therefore, its anti-competitive consequences are presumed.

From the strategic management stance, collaboration with competitors may be directed against customers or suppliers in order to increase the bargaining power of collaborating firms and, thus, improve their competitive position (Porter 1980). The advantages come both from exerting much more control over prices and also from putting rivals who are not included in

the agreement in a relatively worse position. In turn, rival collaboration raises entry barriers or slows the innovation pace. However, this view remains static or in a zero-sum game, as far as it suggests ways to appropriate value while leaving value creation out of focus. Some of such value appropriation efforts are considered as illegal, and, therefore, prohibited.

In sum, while being beneficial to some, the collaboration between competitors is seen as weakening competition, as well as reducing market efficiency. A well-established exception to this anti-competitive view focuses on research and development activities. Collaboration with competitors is seen, in this instance, as a tool to grow entrepreneurial firms successfully through alliances with established companies and to foster innovation (Marks 2009).

The coopetition concept challenges the established anti-trust view by pointing out that, from a theoretical game stance, firms are able to preserve the advantages of both competition and collaboration. From this perspective, coopetition differs from collusion in that firms care about generating additional value, not just seeking the most significant part of it. However, some prior studies show that while coopetition should be a theoretically privileged option, firms are reluctant to use it (Okura 2007).

2.9 COOPETITION AS AN EMERGENT AND DELIBERATE STRATEGY

The study of coopetition has traditionally been investigated as an intentional and planned strategy, entered into by willing participants. However, studies have shown that the coopetition strategy can be both deliberate and emergent (unintentional) (Mariani, 2007; Czakon and Rogalski, 2014; Tidström and Rajala, 2016; Dahl et al., 2016; McGrath et al., 2019), based on the realisation that strategy can evolve outside the human intentions due the evolvement of certain practices (Chia and Rasche, 2015). Rusko (2014), argues that emergent coopetition occurs as a result of the presence of competition in collaborative IORs.

Strategic management literature acknowledges the emergent nature of various strategies, which is also applicable to the coopetition strategy (Mintzberg et al., 1998). Following this logic, authors have attempted to uncover the emergent perspective of coopetition. For instance, studies show that spillover effects (Okura, 2007), the actions or the public sector (Mariani, 2007), consumer needs (Walley, 2007), the nature of the business environment (Bonel and Rocco, 2007), changes in the industry and government regulations (Mariani, 2007; Kylänen and Rusko, 2011), the manifestation of opportunistic behaviours (Ritala, 2010) are some of the

causes of emergent coopetition. Additionally, scholars claim that some of the causes of unintentional coopetition are geographical proximity, co-location and the formation of micro-clusters (Rusko, 2008, Kylänen and Rusko, 2011; Mariani & Kylänen, 2014). However, a counterargument by Della Corte & Aria (2016), shows that geographical proximity reduces the intensity of coopetition among local businesses. Della Corte & Aria (2016) follows the resource-based theory of social complexity to assert that business culture is more significant in determining the likelihood of coopetition among firms than geographical proximity; adding that organisations in close proximity may have significant cultural differences.

Scholars investigating the emergent nature of coopetition found that emergent coopetition can occur in several coopetition phases, including the formation, development and outcome phases. For example, Bonel and Rocco (2007), argue that the unintended effects in the implementation of coopetition, and unanticipated behaviour during coopetition falls within the emergent coopetition spectrum. Additionally, the pattern of emergent coopetition can also be observed in the unpredictable manner coopetition evolves; as a dynamic flow occurs from the competition to a cooperative mindset (Bengtsson et al., 2010; Tidström and Hagberg-Andersson, 2012; Dahl, 2014; Czakon and Rogalski, 2014). Coopetition as an emergent strategy is in line with Mintzberg and Water's (1985), description of emergent strategy, where they described emergent strategies as patterns or consistencies achieved, despite lack of intentions. From this definition, for a strategy to be considered as emergent, the activities of the strategy need to be practised without explicit intentions. While it has been established that coopetition can occur unintentionally, it is surprising that little attention has been paid to this form of coopetition in literature.

While investigating the various perspectives of coopetition, Rusko (2014), argues that some of the features may overlap, therefore realising sixteen various forms coopetition can manifest (Figure 2.14 and Table 2.6). Ruskso (2014), claims that an emergent strategy might be associated with coopetition between different parts of an organisation, including dyadic relationships between firms, networks or other actors. Since this study is concerned with the occurrence of emergent coopetition in an inter-firm alliance, it only focuses on Rusko (2014), it only lists the relevant situations in Table 2.6
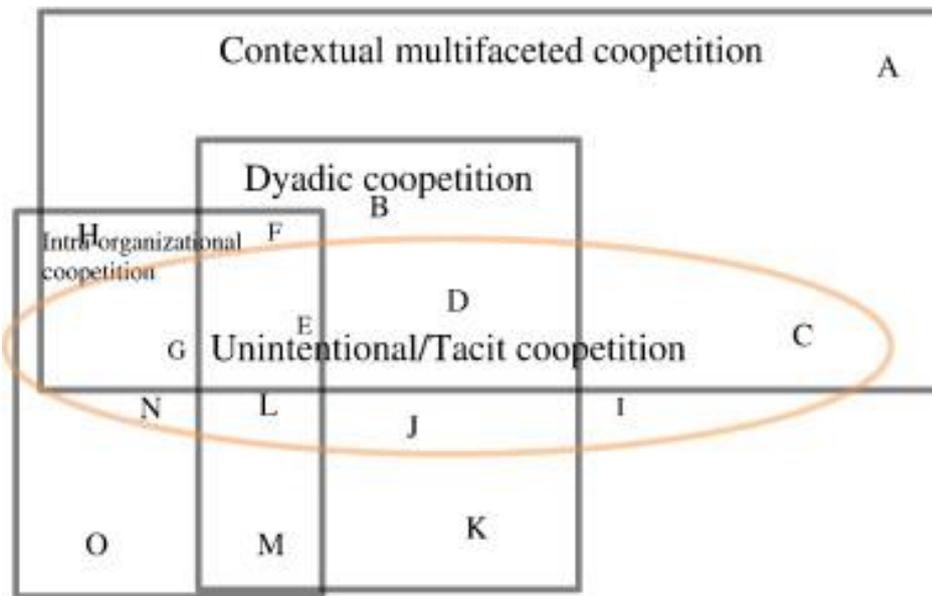
Figure 2.14: The relative positioning of different perspectives of coopetition (Rusko, 2014 p. 803)

Combination of Coopetition	Situation Description
Unintentional coopetition and multifaceted coopetition **(C)**	There are several actors involved in the coopetition situation, and some of these actors have not noticed the coopetition (e.g. co-location, spatial spillovers).
Dyadic and multifaceted coopetition with unintentional relationships **(D)**	Multifaceted coopetition in which there are intentional simultaneous (partly dyadic) competition and cooperation activities between actors, but some of the participants have not noticed the situation.
Unintentional coopetition **(I)**	Coopetition situation based on spillovers, emergent strategy or geographical proximity without any intentional strategy. – A difficult situation to realise in practice.
Unintentional coopetition with dyadic coopetition **(J)**	This kind of a situation might be procedural coopetition, e.g. with unintentional technical spillovers between two firms.

Table 2.6 Different coopetition situations (Rusko, 2014 p. 804)

The classification above shows four situations where unintentional coopetition can occur in IO interactions, based on the form of alliance between the organisations. In classes, C, D and J, the organisations were involved in some form of coopetition, with varying intensity with some of the actors being unaware of the relationship. However, in the case I, the parties are not in any form of coopetition, prior to the emergence of the alliance. This study is interested in situations D and I. Since the OGI is mostly competitive, any collaborative alliance may evolve into unintended coopetition. Similarly, in a case where the competitive aspect of the alliance is low or based on government regulations, coopetition may also occur. This study, therefore, positions its definition of unintended coopetition on cases D and I.

Lundgren-Henriksson and Kock (2016), applied the strategy-as-practice approach to review the emergent nature of coopetition and concluded that since no organisation is born into coopetition, there is a logical flow of coopetition as organisations interact amongst themselves and these interactions may be deliberate or emergent based on the level of influence. They suggest that emergent coopetition is influenced by interactions that occur at a micro-level, whereas, deliberate coopetition is imposed on the organisation at a macro level, usually by the management.

Czakon (2010), developed a framework for the development of emergent coopetition (see: Figure 2.15), where he made three postulations. Czakon (2010) proposes that emergent coopetition is an alternative to IOR dissolution, where the parties continue to cooperate despite having realised they do not have a strategic cooperative fit, in order to enjoy the benefit of the cooperation and have the choice to compete on the same level. Additionally, Czakon (2010), presents emerging coopetition as a form of opportunistic behaviour where one partner seeks to achieve their private gains in the cooperative setting, without any regard for the interest of their partners or the set mutual goals. He suggests that this behaviour occurs as a reaction to the tensions in the relationship. Therefore, it may be worthwhile to investigate the effects of tension management on the emergent coopetition performance.
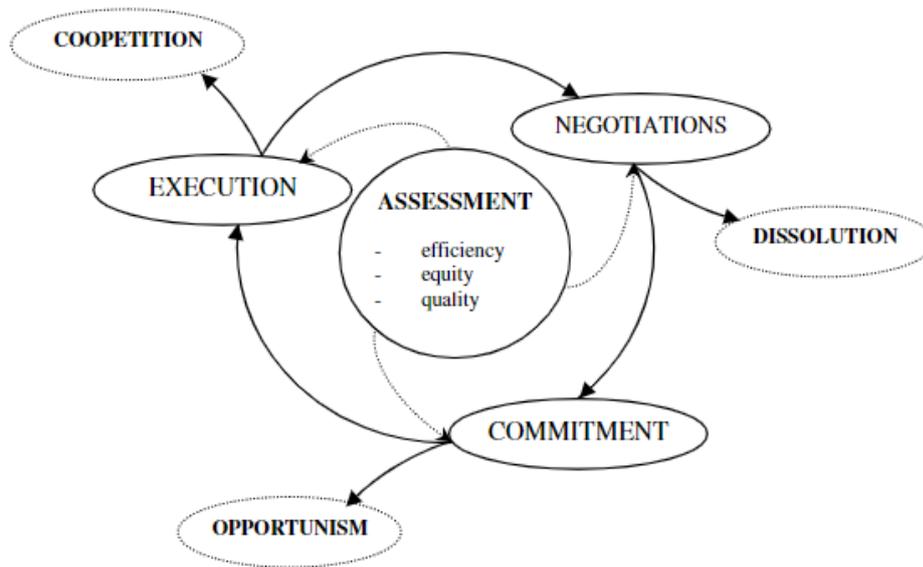
Figure 2.15: Emerging Coopetition in the IOR development process (Czakon, 2010 in Yami et al., 2010 p. 69).

To describe the interactions between the emergent and deliberate coopetition strategy, Dahl et al., (2016), adopts Whittington, (2016)'s approach to underpin the underlying organisational strategy based on three elements. These elements are; practices; which are the shared norms, praxis; the formation and implementation of activities and the practitioners; the actors that engage in the practice and perform the strategic actions. Therefore, to conceptualise coopetition as a general strategy framework, Dahl et al., (2016), considered the influence of all parties involved in the strategic activities, structures, roles and social embeddedness to conceptualise coopetition as occurring on four various scenarios (see Figure 2.16). These scenarios differentiate how coopetition can manifest based on the extent of deliberate or emergent strategic activities in the relationship.

	Deliberate (Inter-organizational)	**Emergent** (Inter-organizational)
Deliberate (Intra-organizational)	*Coopetition strategy as a planned practice* **Practices:** Intra-organizational origin **Praxis:** Formal and rigid, implemented as planned **Practitioners:** Top-management *Example studies*: Brandenburger and Nalebuff 1995; Garraffo and Rocco 2009; Gnyawali and Park 2009; 2011; Herzog 2010; Okura 2007.	*Coopetition strategy as a contextually derived practice* **Practices:** Inter-organizational origin **Praxis:** Formal and rigid, implemented as imposed by context **Practitioners:** Environment → Top-management *Example studies*: Choi, Garcia and Friedrich 2010; Dagnino and Mariani 2010; Fjeldstad, Becerra and Narayanan 2004; Lechner and Dowling 2003; Luo 2007; M'Chirgui 2005; Ritala, Hurmelinna-Laukkanen and Blomqvist 2009.
Emergent (Intra-organizational)	*Coopetition strategy as a reacting practice* **Practices:** Intra-organizational origin **Praxis:** Formal and flexible, implemented as planned **Practitioners:** Top-management/Middle-management *Example studies*: Bonel and Rocco 2009; Das and Teng 2000; Dussauge, Garrette and Mitchell 2000; Hamel, Doz and Prahalad 1989; Khanna, Gulati and Nohria 1998.	*Coopetition strategy as an adapting practice* **Practices:** Inter-organizational origin **Praxis:** Formal/informal and flexible, formulation-implementation-reformulation-implementation **Practitioners:** Environment, organizational members *Example studies*: Baumard 2009; Castaldo and Dagnino 2009; Czakon 2010; Kylänen and Rusko 2011; Mariani 2007; de Rond and Bouchikhi 2004.

Figure 2.16: The Deliberate and Emergent Nature of Coopetition (Source: Dahl et al., 2016, pp., 99).

From the above, the first scenario conceptualised by Dahl et al. (2016) is coopetition as a planned practice. This scenario is a deliberate and formally planned coopetition on the inter-organisational and intra-organisational dimensions. The scenario assumes that the parties have a mutual understanding at various level to intentionally engage in coopetition, and the organisations are capable of planning, predicting and managing the influence the external environment. The top management is the practitioners of this scenario, as they deliberately control the competitive and cooperative actions, while the organisational level deals with the coopetition at the implementation phase. On the other hand, the scenario 'coopetition as an adapting practice' is conceptualised as a fully emergent coopetition strategy, where the business environment influences the formation and development of the strategy based on the market power.

Additionally, the third scenario, coopetition as a reacting practice, assume that the management can predict and influence its business environment in activities relating to competition and collaboration. Here, the intra-organizational level takes an emergent nature as a result of assumed self-interested behaviour, e.g. opportunism, which leads to a spontaneous reformulation of strategic activities and intentions. The final scenario, coopetition, as a contextually derived practice, consists of emergent characteristics at the intra-organisational level and deliberate features at the inter-organisational level. The scenario assumes that the management has limited influence or control on the external environment, while the intentional coopetition at the inter-organisational level is expected to be deliberate as a result of the favourable external environment.

Only a few studies have studies the management of emergent coopetition. McGrath et al. (2019), claims that the management of unintended coopetition is mostly intuitive. Following an analysis of the IORs between entrepreneurs, McGrath et al., (2019) found that even though the entrepreneurs did not have a strategic plan for a coopetitive relationship, they understood the boundaries, limitations and benefits of the alliance. They also found that the research subjects managed the coopetition alliance skilfully, while being unfamiliar with the form of alliance, thereby buttressing findings from studies including Mariani (2007), Kylänen and Rusko, (2011), Rusko, (2011), Rusko, (2014), O'Toole and McGrath, (2018).

As above, several studies have investigated the emergent nature of coopetition; however, there is a noticeable lack in the study of managing coopetition that occurs as an emergent strategy. Going by, Mintzberg and Water's (1985) description of emergent strategy, can it be implied that the success factors in deliberate strategy applicable to those of emergent coopetition? However, since the antecedents of the coopetition formation are different as it occurs without proper planning, perhaps the management, control or success factors may also be different. These questions are vital to advancing the understanding of the coopetition concept.

2.10 MANAGING COOPETITION TENSIONS

Given the paradoxical nature of the coopetition strategy, tensions between the players in the alliance are expected. Therefore, it is important to discuss the management of these tensions to limit frictions in the alliance. The paradox and tensions in coopetition relationships, the sources of tensions and the typologies for tension management are expanded further in appendix 1.

One of the highly debated areas of coopetition study is its management. Coopetition is a highly complicated and complex endeavour, comprising of several facets and should be optimally managed to attain the benefits of the alliance. The combination of two opposing constructs raises tensions at various levels; inter-organisational, intra-organisational and individual (Bengtsson and Kock, 2000; Luo et al., 2006; Padula and Dagnino, 2007; Fernandez et al., 2014; Tidström, 2014; Le Roy and Fernandez, 2015; Ansari et al., 2016; Fernandez et al., 2018). These tensions are driven by the conflicts between the creation and appropriation of value (Ritala and Tidström, 2014; Rai, 2016).

There have been several assertions about how coopetition should be managed based on several aspects of the concept. Some authors reviewed the management of coopetition based on its inherent tensions, with the belief that managing the paradoxical tensions of the relationship would help address its conflicts (Bengtsson and Kock, 2000; Chen 2008; Smith and Lewis, 2011; Pellegrin-Boucher et al., 2013). Pellegrin-Boucher et al. (2016), investigated how formal and informal management tools and techniques impacted individuals in coping with coopetition tensions. Meuer et al. (2016) studied how leadership styles and management structures affect coopetition; they found that formalisation and centralisation have opposite effects on cross-functional coopetition. Other authors have investigated the role of information sharing and protection in managing coopetition. For instance, Estrada et al. (2016), discovered that it is easier to manage coopetition when knowledge sharing and protection mechanisms are in place. Fernandez and Chimbaretto (2016) also stress the need for informal and formal controls in coopetition management.

There is yet to be a consensus in management research about the most suitable coopetition management technique or under what conditions each method should be adopted. On the one hand, authors suggest splitting the primary elements of coopetition; collaboration and competition and managing the two dimensions separately (Dowling et al., 1996; Bengtsson and Kock, 2000; Herzog, 2010), which is known as the separation principle. They argue that the separation can be functional, spatial or temporal. For instance, while partners cooperate on an activity such as R&D, they can compete on other activities, e.g. marketing. However, other studies have pointed the limitations of this principle, claiming that it creates new internal tensions in the relationship and can cause conflicts and issue of distrust among the parties (Das and Teng, 2000; Chen 2008). It was also observed that this form of tension management is more accepted in western literature because the coopetition paradox is usually considered within an 'either/or' framework (Raza-Ullah et al., 2014).

Fernandez et al., (2014), adds that the most suitable approach to adopting the separation concept is to create two distinct dedicated teams to maintain the competition and cooperation phases of the alliance. Although, Castaldo et al., (2010), suggests that an independent third-party can be jointly selected by the collaborating parties to manage the relationship within the separation concept. However, Fernandez (2015), argues that an impendent third party cannot successfully manage a coopetitive relationship. Further studies found that this management style is more suited to coopetition that occurs as a planned strategy, with no evidence about its success in unintentional coopetition (Castaldo et al., 2010; Le Roy and Fernandez, 2015; Fernandez et al., 2018).

On the other hand, some authors agree that each coopetition partner accepting the tensions in the relationship by simultaneously engaging with both coopetitive dimensions is beneficial for the alliance, as the parties would understand their roles in a paradoxical context and act accordingly (Lüscher and Lewis, 2008; Smith and Lewis, 2011). This principle is called the integration principle, which seeks to balance the opposing elements of coopetition, within the 'both/and' framework (Raza-Ullah et al., 2014). Clarke-Hill et al., (2003), argues that instead of reducing the cooperative or competitive dimensions of coopetition, partners should attempt to maintain a healthy balance of both dualities. However, Luo (2007), notes that it may be challenging for partners in a complicated relationship, such as coopetition, manage the dualities simultaneously and achieve optimal benefits. Notwithstanding, Le Roy and Fernandez (2015), recommends this technique particularly for coopetition with high levels of tensions.

The integration technique posits that management actions within this concept affect both the competition and collaboration phases of the relationship (Chen, 2008). In agreement, Park, Srivastava and Gnyawali (2014), propose a strategy to balance the opposing elements of coopetition. Their strategy is such that the competition element of the relationship should be managed dependent on the level of the collaboration and vice-versa. Thus, a high level of competition requires equally high management of cooperation.

Interestingly, studies have shown that these two principles can be combined to mitigate the challenges with the principles being adopted separately and to ensure the relationship is effectively managed (Pellegrin-Boucher et al., 2013; Fernandez et al., 2014; Fernandez et al., 2018; Wilhelm and Sydow, 2018). As mentioned above, the separation principle introduces another source of tension in the relationship, particularly inter-individual conflicts (Wong and Tjosvold, 2010). The integration principle relies on the capabilities of the partners to

understand the roles and accept the tensions present in all aspects of the relationship, thus, helping to balance the interactions to make sure it is not focused more on one dimension of the alliance. Thus, integration helps manage inter-individual tensions by setting expectations in the relationship (Smith and Lewis, 2011). Therefore, the two principals have been described as a complementary and simultaneous solution to managing a coopetitive alliance.

Wilhelm and Sydow (2018) argue that a paradox cannot merely be broken down into antecedents-process-outcome relationships among the core constructs, but should be studied as a process reflecting cynical dynamics (Hargrave and Van de Ven, 2017). The study of coopetition tension management by Wilhelm and Sydow (2018) shows that both the integration and separation tension management approaches can be lead to successful coopetition outcome; however, the organisations must possess strong coopetitive capabilities, which corroborates the stance by Gnyawali and Park (2011), about the need for coopetitive mindset.

Another method of managing coopetition tension, as suggested by Le Roy and Fernandez (2015) is the co-management approach, which is essentially the duplication of governance structure and managerial functions to balance the coopetition elements.

A notable study by Tidström (2014), presented four scenarios of coopetition tension management. The study found that a cooperative approach to managing tension resulted in a mutually positive outcome for the parties, whereas a competitive management style leads to a mixed outcome. In the third scenario, Tidström (2014) investigated companies where the coopetition strategy was forced and found that the companies used avoidance strategy instead of the competitive or cooperative means to manage the tensions. The study concluded that the successful management of coopetition tensions depends on the awareness of the drivers of the relationship.

Since studies have shown that the ability to manage tensions is more successful when they are aware of the relationship (Castaldo et al., 2010; Le Roy and Fernandez, 2015; Fernandez et al., 2018), this study would investigate the effects of tension management on forced or unintentional coopetition.

2.11 THE ROLE OF A DEDICATED ALLIANCE FUNCTION IN COOPETITION

Alliance functions is another crucial aspect of studies carried out in management literature concerned with IORs. Alliance functions have been studied extensively, as researchers and organisations have realised the benefits of alliances; which includes: enhancing market power, increasing organisational efficiencies, providing the opportunity to enter new markets, and allowing organisations access new resources and capabilities (Kogut, 1991; Ahuja, 2000; Garcia-Canal et al., 2002; Rothaermel & Boeker, 2008; Bouncken et al., 2015; Ritala et al., 2016; Chou and Zolkiewski, 2018). As previously established, organisations cannot exist in isolation; hence, organisations focus on achieving beneficial alliances. Studies show that organisations dedicate a minimum of 20% of their resources to alliances (Ernst, 2004; Kale et al., 2009; Bouncken and Fredrich, 2012; Fernandez et al., 2018; Klein et al., 2019). However, not all alliances are successful. Studies show that up to 70% of IO alliances are either unsuccessful or terminated before the expected dissolution of the alliance ties at a high cost to the parties involved (Huxham and Vangen, 2000; Dyer et al., 2001; Kale at al., 2002; Bamford et al., 2004; Zineldin et al., 2005; Walley, 2007; Lunnan and Haugland, 2008; Bakker, 2016).

A strategic alliance is defined as a purposive IOR between more than one independent organisation, which involved sharing, exchange or co-development of resources or capabilities to achieve a mutual goal (Kale and Singh, 2009; Mesquita et al., 2017). Previous sections have established that coopetition is a form of strategic alliance; however, its choice of strategic partner is what differentiates it from other forms of traditional alliance. Therefore, several learning opportunities can be realised from adopting alliance capabilities to coopetition.

Alliance capabilities refer to an organisation's ability to initiate, develop and maintain collaborative relationships with its alliance partners to ensure a successful alliance (Lavie, 2016). Thus, an organisations ability to manage IORs suggests a dynamic alliance capability. Scholars attributes the performance of an alliance function to the alliance capability of the individual organisations (Anand and Khanna, 2000; Dyer et al., 2001; Kale et al., 2002; Kale and Singh, 2007; Wassmer, 2010; Wang and Rajagopalan, 2015; Kohtamäki et al., 2018). They add that strategic fit and the strength of the alliance also influence the outcome of an alliance function. The scholars agree that organisations with useful alliance capabilities are better positioned to select partners that are a strategic fit for the organisation (Degener et al., 2018; Robson et al., 2019). Alliance capabilities are concerned of both individual IOR alliances and the entire organisation's alliance portfolio. The alliance function is concerned with activities

such as; selecting strategic alliance partners, initiating the relationships, negotiating the terms of the alliance, deciding on the structure and governance of the exchanges, adapting and dissolving the relationship, as well as managing the coordination, communication and bonding processes during the alliance (Anand and Khanna, 2000; Dyer et al., 2001; Kale et al., 2002; Schreiner et al. 2009; Wang and Rajagopalan, 2015; Degener et al., 2018; Robson et al., 2019).

Primarily, alliance capabilities are concerned with proactively managing organisational alliances by studying their past engagements and observing and adopting best practices to improve the performance of future collaborations (Zollo and Winter, 2002; Wassmer, 2010; Wang and Rajagopalan, 2015). Scholars suggest that assembling a dedicated alliance management team can enhance organisations alliance capabilities (Heimeriks and Duysters 2007; Kale and Singh 2007; Degener et al., 2018). The alliance management function involves assembling a team of alliance specialists dedicated solely to managing organisational alliances, consisting of individuals competent in partner selection and relationship assessment, conflict resolution, knowledge sharing and legal issues (Kale et al. 2002; Heimeriks et al. 2009; Degener et al., 2018). The alliance team, therefore, becomes instrumental in trust-building, knowledge sharing, recognising and accessing complementary assets, establishing safeguards and engaging problem solving and resolving conflicts; which contributes to value creation in IORs (Kale et al. 2002; Reuer et al. 2006; Degener et al., 2018).

In the study of alliance capability development, several studies have stressed the role of having a dedicated alliance function. For example, Kale et al., (2002), discovered that organisations with a dedicated alliance function outperform organisations without this function in IO alliances. Other studies confirm this stance, while also stressing the need for partnering experience (Kale and Singh 2007; Schilke and Goerzen 2011). They argue that a robust dedicated alliance function team can assist with effective partner selection, alliance formation and the adoption of the most appropriate governance for the alliance (Gulati et al. 2009; Wang and Rajagopalan, 2015; Robson et al., 2019). Additionally, this capability can allow the organisation to identify best practices, avoid pitfalls, enhance experiential learning while facilitating internal coordination and specialisation, which are all critical for a positive alliance. Kale and Singh (2007), shows that the dedicated function allows organisations to become a more attractive alliance partner, allowing the organisation to become more visible to stakeholders, which therefore promotes corporate support. The dedicated alliance function primarily manages any IOR from inception to its dissolution.

Several studies have supported the benefits of having a dedicated alliance function to promote standardisation, formalisation and the centralisation of alliance management in organisations (Dyer et al., 2001; Kale et al., 2002; Kale and Singh, 2007; Wassmer, 2010; Wang and Rajagopalan, 2015; Kohtamäki et al., 2018). However, other studies claim that the role of a dedicated alliance function is negligible, arguing that the function does not create any added value to alliance relationships (Anderson and Jap, 2005; Fang et al., 2011; Findikoglu and Lavie, 2018). They argue that once the necessary factors for alliances are present such as trust, strategic partnership fit, contractual agreements, conflict resolution mechanism, the outcome of the partnership would be positive regardless of the presence of an alliance function (Anderson and Jap, 2005; Fang et al., 2011; Findikoglu and Lavie, 2018).

While the role of dedicated alliance functions has been established in IO alliance literature, only a few studies have investigated its role in coopetition relationships, especially its role in improving organisational performance. Some coopetition scholars have stressed the importance of a dedicated alliance structure in attaining coopetition success based on its application in alliance literature (Bengtsson and Kock, 2000; Zeng, 2003; Bouncken and Fredrich, 2012; Yong et al., 2014; Bouncken et al., 2015; Dorn et al., 2016). There are a few studies that have investigated the application of dedicated alliance function in a coopetition relationship. For instance, Bouncken and Fredrich, (2012) found that in a coopetition relationship dominated by high trust and dependence, a dedicated alliance team increases the chances of coopetition success. Dorn et al. (2016) position the assembling of an alliance team at the initiation phase of a coopetitive alliance. What is unclear about this positioning is if an alliance team is assembled at the initiation phase, does that imply that the team is created for the specific relationship? There are many questions left unanswered with regards to the influence of an alliance function on coopetition performance. For instance, how does the alliance function influence the choice of governance structure and the outcome of the relationship?

There have been several calls for papers to address the lack of studies in this area with a recent publication calling for the studies on the influence of a dedicated alliance function on coopetition performance (Klein et al., 2019 p. 12). Therefore, this study seeks to uncover the influence of a dedicated alliance function on coopetition performance.

2.12 GOVERNANCE STRUCTURE IN COOPETITION

Governance in IORs refers to the formal or informal rules of exchange between the parties in the alliance (North, 1991; Gulati, 1998; Vandaele et al. 2007; Provan and Kenis, 2008; Müller et al., 2016). The choice of governance mechanism to develop and manage IORs is pivotal, as it can determine the outcome of the alliance (Klein-Woolthuis et al., 2005; Carson et al., 2006; Cao and Lumineau 2015; Müller et al., 2016). For example, Hoetker and Mellewigt (2009), found that the choice of governance mechanism influences the coordination of activities and resources among the partners in the alliance, which can protect parties from opportunism.

Governance can adopt various mechanisms such as; trust (Das and Teng, 1998; Müller et al., 2013), contracts (Mayer and Argyres, 2004; You et al., 2018), relational norms (Liu et al., 2009), formal control (Yang et al., 2011), social control (Li et al., 2010), reporting mechanisms (Hoetker and Mellewigt, 2009), social bonds (Randolph, 2016), reciprocity (Voss et al., 2019), specified directives (Bouncken, 2009). The various forms of governance mechanisms fit into two main classes of governance – transactional and relational governance. Transactional governance (TG) is based on TCE (Williamson, 1975), and centres around explicit, formal mechanism such as contracts (Vandaele et al. 2007). Relational governance (RG) manifests in socially derived arrangements, which are informal such as reciprocity, trust and social embeddedness of actions, which can prevent issues relating to opportunism and coordination problems (Muthusamy and White, 2005; Vandaele et al. 2007).

Coopetition literature has established that proper governance can reduce the risks associated with the strategy, thus enhancing the performance of the alliance (McGill 2007; Cassiman et al., 2009; Müller et al., 2016). For instance, Hung and Chang (2012) show that contractual agreements help protect organisations core function, which improves its competitive advantage. On the other hand, scholars claim that RG can help reduce opportunistic behaviours among partners (Das and Teng, 2000; Chin et al., 2008; Fernandez et al., 2014). The two forms of governance mechanism are discussed further in the following sections.

As mentioned above, relational governance is embedded in social relationships and is based on a mutual exchange between the parties in IO alliances (Granovetter, 1985; Muthusamy and White, 2005; Vandaele et al. 2007). It centres around exchanges governed by trust, commitment, fairness, mutual understanding in a cooperative atmosphere (Muthusamy and White, 2005; Liu et al., 2009). According to Puranam and Vanneste (2009), a relational

governance mechanism develops over time, where the partners become familiar with each other, and learn their capabilities. This experiential learning of the potential partners can help reduce opportunism and creates a stronger bond among the partners (Woolthuis et al., 2005; Liu et al., 2009; Tangpong et al., 2010). Authors argue that relational governance is useful in alliances where it is challenging to specify duties, timelines, the process for conflict resolution (Liu et al., 2009; Randolph, 2016; Voss et al., 2019). The authors argue that repeated interactions between the partners help establish the behaviours and interest of the parties. This knowledge of the party's motives can then foster better knowledge sharing and understanding among the firms (Dyer and Hatch, 2006; Liu et al., 2009; Tangpong et al., 2010). RG allows partners to deal with uncertainties in IORs and encourages openness towards knowledge transfer and communication. Therefore, suggesting that the RG governance mechanism suitable for long-term relationships, especially when the level of uncertainty is high (Wang et al., 2011).

Importantly, RG stresses the need for social interactions and joint efforts in developing and maintaining long-term alliances based on trust and commitment. The core of RG is to develop trust and commitment through continuous social interactions, reflected in mutual goals and joint problem-solving (Muthusamy and White, 2005; Randolph, 2016). As a result, scholars argue that RG is more effective in reducing transactional costs and coordinating IO activities (Frazier, 2009; Tangpong et al., 2010; Müller et al., 2016).

To further understand the role of relational governance mechanism in coopetition alliances, this study focuses on the role of trust as a governance mechanism and its influence on the outcome of coopetition.

The paradoxical nature of coopetition implies that coopetitive partners would require to share resources and information which may include highly sensitive intellectual properties perhaps responsible for their competitive advantage. Therefore, several studies of IORs have identified trust as critical to the success of any collaborative alliance (Anderson et al., 1994; Cannon and Perreault, 1999; Chin et al., 2008; Osarenkhoe, 2010). Trust has been viewed as an indication of the extent of confidence that exists among parties involved in IORs, and their willingness to sacrifice to attain mutual benefits (Osarenkhoe, 2010). Kale et al., (2000), argues that a relationship with a high level of trust can ensure a freer exchange of information and capabilities, as it lowers the fear of opportunism, therefore, making the alliance more attractive to potential partners. In agreement, Osarenknhoe (2010), adds that there is a positive

relationship between the level of trust and the degree of transparency in a coopetitive relationship. This assertion is in line with Luo (2004)'s argument that for successful coopetition, organisations should adopt a coopetitive mindset which includes trust creation and development.

According to Zindeln, (2004), success in a coopetitive interaction can only be achieved when the partners involved can communicate, collaborate and compete in a trusting environment, characterised with honest debate, mutual positive goals and interdependence. Similarly, Nielsen (2011), found that trust in a relationship can reduce risks and conflicts as it allows for the creation of goodwill, which can foster commitment among partners. Notably, since the notion of trust in IOR literature is seen as a governance mechanism, they appear in the post-formation phase of a relationship (Kale, 2000). However, Dorn et al. (2016) argue that trust-building should be considered at the initiation of the alliance. They argue that the notion of trust is vital when selecting alliance partners, as a relationship in a trusting environment improves the chances of coopetition success (Wolff, 2016).

Management literature studying the role of trust in IOR has agreed that trust is a necessary condition in collaborative alliances, both among individuals and groups. Trust has been considered as a critical requirement for information sharing and the avoidance of opportunism in interactions among organisations, to ensure success and improve opportunity for innovation (Dodgson, 1993; Müller et al., 2013; Voss et al., 2019). Creed and Miles (1996), state that an IOR without trust or with low trust levels is destined for failure, implying that no IOR can occur successfully without a high level of trust. Similarly, Grandori and Saod (1995), suggests that the level and nature of trust that exists among organisations largely depends on the form of trust-building mechanism in place to facilitate the interaction.

Although inter-organisational trust has been defined and conceptualised in several ways, the two critical issues that trust addresses in an IOR are the risk and uncertainty that emanates from a relationship with other parties where the real motives for the association are unclear and the issue of accepting vulnerability in these interactions. For instance, Luhmann (1988), argues that trust is an essential mechanism which allows a party to calculate the risks of being vulnerable in a situation with some degree of uncertainty. Therefore, suggesting that for trust to occur, there must be some uncertainty, where one must determine the risk of vulnerability, with the expectation that the other party would not jeopardise the relationship, regardless of the presence of control mechanism (Mayer et al., 1995; Chin et al., 2008; Nielsen, 2011;

Randolph, 2016). Additionally, Meyerson et al. (1996), claims that the need for trust in an IOR is high when the parties are interdependent. Some examples of sources of vulnerability in IOR can be reputation, resource and information sharing.

Trust is a multi-dimensional concept which has been conceptualised in various forms by several authors. For instance, trust has been viewed as an interaction of values, attitudes and emotions (Jones and George, 1998). Similarly, Sako (1992), suggests that the three reasons for a party to expect another party would behave in a mutually beneficial way are based on contractual agreements, they are confident in the competency of the other parties, and, the existence of goodwill. These reasons are in line to Shapiro et al., (1992), classification of trust, where he suggests that trust can be classed based on deterrence, knowledge and identification. Additionally, Zucker (1986), indicates that the three primary mechanisms for trust-building are based on process (reciprocity), character (social similarity), and institutional (social embeddedness). Another dimension as identified by Ring and Van de Ven (1994), is regarding the formation and maintenance, fragile trust is easily formed and broken, and resilient trust, is stronger than fragile trust and can withstand several transactional relationships. Jones and George (1998), adds that there is conditional trust which is usually formed at the inception of an interaction, based on the assumption that it is easier to trust than to distrust and unconditional trust which is developed when the cooperation has advanced over a certain period, and experiential learning of the other parties have occurred. Typically, Jones and George (1998), claim that absolute trust creates a more conducive cooperative environment than conditional trust, which leads to the question of the logicality of trust another party unconditionally. Other dimensions of trust identified focuses on the effects of time in trust-building. For instance, Meyerson et al., (1996) suggest that swift trust can be developed among parties in interactions characterised with a short period, and its developmental process would be dependent on interpersonal relationships.

These dimensions and typologies of trust are critical in reviewing the role of trust in coopetition. For instance, to accept vulnerability to another party, particularly when sharing vital information, a party needs to be assured that the risk of opportunism is averted, what remains unclear is if trust alone is enough to prevent the threats.

Zaheer et al. (1998) define inter-organisational trust as the extent of collective trust orientation that exists among organisations. Similarly, Currall and Inkpen (2002), adds that this mutual trust exists as a result of previous experience. They noted, however, that inter-organisational

trusts should be treated differently from the trust that exists among humans as they are not equivalent. The concept of trust is comprehensive and complex; hence, it has been deconstructed into several dimensions to make sense of all the attributes of the notion, for example, good-will trust and competence-based trust (Saparito et al., 2004; Lui & Ngo, 2004).

Due to the multidimensional nature of trust, it has been conceptualised in various forms by different authors. For instance, Gambetta (1988), describes trust as a quasi-rational estimate of how a party perceives the future action of another, while Dasgupta (1988), views it has a dispositional characteristic of the trustor and reciprocal or relational from an organisational viewpoint (Zaheer and Venkatraman, 1995).

Notably, while there are several definitions of trust in management literature, Johnston et al., (2004), points out that most of these definitions contain two significant elements, confidence or predictability in one party's expectation about the behaviour of other (competence-based trust) as well as the hope of goodwill from that party (goodwill trust) (Ring and Van de Ven, 1992; Ganesan, 1994; Mayer et al., 1995; Doney and Cannon, 1997; Zaheer et al., 1998). The premise of competency-based trust is that a party behaves predictably, performs according to expectations with consistency and stability (Nooteboom et al., 1997; Ganesan, 1994; Klein et al., 2002), while goodwill trust is focused on the motives of the parties and the expectation that a party would act fairly even when there is an opportunity to make private personal gains (Saparito et al., 2004).

According to the Transactional Cost Economics (TCE), which is one of the essential theories for calculating the risks in IORs (Williamson 1975), the extent of a partner's opportunism is unknown. It cannot be wholly calculated, and the notion of trust in IOR, cannot avert the risks. Therefore, control measures should be established to guard against opportunism. Some of the actions that can be adopted are the use of coercive power, deterrence, hierarchal supervision, contract enforcement and monitoring, the threat of exit, damage of reputation, impairment of hostage (Maguire et al., 2001). Another view of trust is from the social science perspective, where it is believed that trust does not have to be unconditional or blinding and can serve an informal control mechanism to reduce the relational risks in IORs (Ring and Van de Ven, 1994; Berger and Noorderhaven, 1997). They argue that not all humans in the business environment are opportunistic and driven by self-interest, but some are honest and have the common human decency with can be enhanced in a trusting relationship, through reciprocity, personal bonding etc.

Some authors have argued that the two perspectives of trust mentioned above are alternatives and can only serve as substitutes, i.e. where there is low trust level, control measures are essential, where the trust is high, limited formal control is required. (Anderson and Narus, 1990; Knights at al., 2001). However, counter-arguments suggest that because trust and legal controls are interrelated in several dynamic patterns, they should be viewed as complementary, rather than substitute constructs (Zaheer and Venkatraman, 1995). For instance, Luhmann (1988), argues that formal control in IORs, facilitates a trusting relationship, as it improves predictability. Since management literature supports the complementarity of legal controls and trust; it becomes essential to discuss what these controls are, in particular, contracts and how they influence, trusts in IORs.

Formal contracts are legally binding written agreements between two or more parties (Lyons and Mehta, 1997). Notable, while an agreement can take several formats, such as verbal, implicit or explicit, a formal contract refers to an agreement written in a legal form (Lyons and Mehta, 1997). For a preferable outcome in an IOR, the formal contract should contain necessary extensive clauses to address issues such as uncertainties, asset specificity and the frequency of the transaction (Williamson, 1985). Accordingly, Chen (2000) realised that contracts vary in degree of completeness, adding that the more specific clauses a contract has, the more complete it and legally binding it is, as it is easier to enforce agreements with provisions which are not open to interpretation. For instance, a contract for an IOR, should contain specific terms relating to sharing and managing of intellectual properties, issues to relating conduct in a relationship, such as working with other parties that may be detrimental to the relationship, non-disclosure, relationship duration, roles and responsibilities of each party, conflict resolution, relationship termination etc.

There are two primary reasons for contracts in an IOR, control and coordination (Mellewigt, Madhok and Weibel, 2007). Control is necessary to ensure effective outcomes in IORs by establishing measures to prevent devious behaviours and holding parties responsible for their actions. Coordination, on the other hand, serves as an enabling process to achieve a mutually desired outcome by providing linkages between various tasks. For instance, this dimension encourages communication and information sharing among the parties and ensure all partners understand the objectives of the relationship and how they to be achieved.

There are three different perspectives regarding how formal contracts influences trust in an IOR. The first perspective is that formal contracts enhance a trusting relationship since the

parties cannot break a formal agreement, which may result in legal sanctions; contracts are viewed as a prerequisite for trust (Mellewigt et al., 2007). On the other hand, contracts have been perceived as being detrimental to trust in a relationship, as contracts may be seen as a sign of distrust and can increase the level of tension in the relationship and affect future relationships (Lyons and Mehta 1997; Chen, 2000). Thirdly, trust is perceived as preceding a relationship, therefore, eliminating the need for contracts. This perception of trust and formal contracts argues that a trusting relationship, e.g. intimate personal relationships can serve as a control mechanism in an IOR capable of preventing opportunism, thus making the need for contracts unnecessary (Bradach and Eccles, 1989).

From a coopetition viewpoint, Brolos, (2009), believes that trust can act as a social lubricant to improve the relationship among partners and help develop shared values even if the parties are in competition with each other. This stance follows from (Das and Teng, 2001), claim that trust has a positive impact on IOR and can be substituted for formal contracts. According to them, under high trust, partners in coopetition do not require a detailed contract with specific anti-opportunistic clauses. Instead, the partners rely on effective communication and have limited need to manage and control the alliance process. Thus, they suggest that under high trust situations, coopetition alliances can be initiated, implemented and managed by in house managers as opposed to having a formal contract dictate the mode of the relationship.

However, Gargiulo and Ertug (2006), found that relationships with high trust are not immune to adverse outcomes. For instance, Gargiulo and Benassi, (2000), found that IORs with high trust can be unproductive, Garguiolo and Ertug (2006), adds that this types of IORs can increase the likelihood of abuse and betrayal in the relationship. Similarly, Corsten and Felde, (2005), notes that relations with high trust can become uncomfortable, especially when the rate of dependency is not balanced, which may lead to a party feeling vulnerable. Thus, they argue that despite the trust in the relationship, control measures such as contractual agreements need to be in place.

Interestingly, a study by Woolthuis et al., (2005) investigating the outcome of IORs based on the level of trust and contractual agreements (Table 2.7), suggests that only relationships with high levels of trust are successful. According to them, contracts are not essential to the success of an IOR. However, their study did not consider the level of dependency on the results and outcome of the relationships, even though they acknowledged and discussed the effects of dependence.

		Degree of Trust	
		Low	**High**
Contract	**Low**	Conflict and premature end	Successful
Completeness	**High**	Conflict and premature end	Successful

Table 2.7: Outcome of the relationship between contracts and degree of trust (Adapted from Woolthuis et al., 2005, p. 823)

In the situation with low trust and high contract completeness, which was not a successful relationship, one party was highly dependent on the expertise, resources and capabilities of the other party and only provided financial assistance in the alliance, which caused the relationship to fail as the independent party had no incentive to continue the relationship. Additionally, the dependent party could not enforce the contract agreement as they realised that the independent partner may still be useful for future relationships. On the other hand, the relationship with high trust and low contract completeness, the rate of interdependency were balanced. Each party invest a similar amount of resources and expertise to the relationship and any risks to the alliance would be shared by all parties involved. Similarly, the situation with low trust and low contracts control involved parties with an asymmetric rate of dependency. In fact, if Table 2.7 is presented with the rate of interdependency replacing the contract agreements, the outcome would remain the same. Therefore, showing that the study about the effects of contract agreements in an IOR is flawed.

Since there is no consensus on the appropriate control mechanism, it is vital to investigate the influence of trust and contractual agreements, both on deliberate and emergent coopetition.

2.13 THE SUPPLY CHAIN PERSPECTIVE

Even though, the supply chain role was previously relegated to a tactical level in organisations to provide cost-efficient goods or services (Bovet & Martha, 2000), it is now increasingly being seen in a strategic light, as it is can contribute an organisations' competitiveness (Fine, 2000; Dath et al., 2010). Substantially, SC has been described as a tool to allow an organisation to achieve its strategic goals (Hill and Hill, 2009). An effective and efficient SC can reduce waste, unnecessary inventories, increase profits, suitable market positioning, which all contributes to the bottom line of the organisation.

Although, there are several definitions of SC in literature, for example, it has been described from a push approach, used to transform raw materials to finished products (Mabert and Venkataramanan, 1998), it has also been described as to encompass the management of business activities and relationships with the organisations' suppliers and customers (Harland, 1996). A more explicit description of SCM, as offered by Cohen and Lee (1998), states that SCM involves the management of both intra-firm and inter-organisational business activities. They add that the intra-organisational aspect includes activities such as procurement, and the inter-organisational part is concerned with the distribution and delivery of these products to the end-users. As a result, SC has been described an encapsulation of several complex inter-related strategic elements that can be leveraged to improve an organisation's competitiveness (Tan, 2001).

SC had evolved over the past decade when it was merely interested in minimising the cost of production and collaboration or integration within suppliers was not an accepted practise (Tan, 2001). However, as a result of globalisation, SCs, were forced to implement more efficient practices, thus, began to pay attention to the flexibility of the SC, and the production of high-quality goods in addition to its focus on costs (Tan, 2001). As a result, strategic partnership and SC integration became more popular. Some of the benefits of these partnerships are that the focal organisation can leverage on the strength of their suppliers to improve the efficiency of their SC (Ragatz et al., 1997). Additionally, it has allowed the focal organisation to understand their critical activities, to identify areas for improvement, and will enable the coordination of material and information flow across the SC (White et al., 1999). The integration of SC activities within the value chain has now been described as useful, such that a higher level of integration between a focal organisation and its suppliers is expected to increase the competitiveness of the organisation (Qrunfleh and Tarafdar, 2014).

2.13.1 Flexibility in Supply Chain

As mentioned above, speed and costs were described as the most critical SC drivers for organisations. These drivers have been said to be effective in steady market conditions, as the SCs are focused on economies of scale, i.e. quick delivery of supplies at the lowest possible cost. However, SCs that focus on these drivers are not able to react to any changes in the SC as a result of the external business environment, such as a change in demand.

The current reality of the business environment, for instance, Brexit, the dwindling crude oil in the North Sea, change in market demand (i.e. the shift towards cleaner, renewable energy) etc.,

are potential sources of uncertainties in the OGI and requires SCs that can effectively address these issues, in a manner that still allows the organisation maintain its competitive advantage. It has been suggested that having a flexible SC will enable organisations to deal with issues regarding the changing demand of the industry (Nsikan et al., 2019).

Flexibility in SC has been extensively researched in supply chain literature (Gosain et al., 2004; Wang and Wei, 2007; Qrunfleh and Tarafdar, 2014; Amoako-Gyampah, Boakye and Adaku, 2019 etc.), with various typologies proposed. For instance, Slack (1983), presented five types of flexibility - new product, product mix, product quality, volume and delivery. Following studies extended these types of flexibility to seven (Gerwin, 1987), Narasimhan and Das (2000) presented 10, while Vokurka et al., (2000) showed 15 including machine, material handling, operations, labour, automation etc. Notably, the focus of these typologies was presented on a firm level.

More recent studies have started to realise the benefits of SC flexibility on an inter-firm level particularly within an SC network (Duclos et al., 2003; Lummus et al., 2003; Kumar et al., 2006). The concept has been described as the ability of a business process to manage or effectively react to changes in the SC, without a significant effect on the speed, cost, quality and performance on the SC (Viswanadham & Raghavan, 1997). The flexible ability of an organisation has been further divided into three components based on how it affects the operations of the SC. These categories are; adaptability refers to the capability of the SC to adjust its structure based on the shifts in the markets. Alignment refers to a focal organisation creating incentives for collaboratives partners within the SC, which can improve the performance of the organisation and agility, which refers to the SCs ability to quickly react to the changes or disruption in the SC caused by external factors (Lee, 2004).

Although, these categorisations of SCF, has been critiqued as authors suggests that for any of the other classifications to be met, there needs to be prior understanding between the collaborative partners in the SC, hence alignment should be considered as a prerequisite to flexibility rather than a form of flexibility (Qrunfleh and Tarafdar, 2014). Thus, it has been argued that flexibility is a combination of agility and adaptability.

The role of SCF has been discussed as being crucial in IORs such as the relationships that exist between buyers and suppliers, in demand-driven and marketing roles as well as in production and manufacturing SCs. With regards to the effects of SCF in IORs, it has been argued that the changes that occur in the external business environment have reinforced the need for a mutually

trusting relationship between a focal organisation and its suppliers. Wadha et al., 2008, argue that routing flexibility, which is a focal organisation' ability to choose and change suppliers as necessary (based on its immediate needs) can improve the performance of the organisation since they have the opportunity to select the best suppliers to suit their needs. Even though some authors have argued that the substantial cost implication of switching suppliers outweighs the benefits of flexibility, other researchers believe that the cost of competitiveness and relevance compensates the cost incurred. Nonetheless, there is evidence that a flexible SC can positively impact the performance of both an organisation and its overall SC, especially when there is a high level of uncertainties in the external market.

Unsurprisingly, several studies have suggested that the flexibility of an SC can allow the OGI, address and cope with the current downturn and uncertainties in the industry (Agarwal, Sharma, and Mathew, 2016; Nsikan et al., 2019). Similarly, (Accentures, 2016; Mckinsey, 2017; Oil and Gas UK, 2018) observed that many OG organisations are now integrating their SC to become more flexible in addressing the risks in the industry, and it has positively influenced their business performance. Although, there are limited studies regarding the impacts of coopetition on SCF, Yu-Ying, Chang-Sheng and Ning (2013) found that coopetition can improve SC flexibility as organisations are able to leverage on the resources of other organisations, thus providing the capacity to respond effectively to challenges or changes in their SC in an efficient manner. Therefore, it becomes necessary to investigate the effects of an organisations' flexibility on the outcome of coopetition.

2.14 CHAPTER SUMMARY

This chapter reviewed some of the relevant themes in coopetition and SC studies, drawing from theories such as RBV, TCE, SET, institutional and game theory. The section discussed issues relating to coopetition, such as the evolution of coopetition, its themes, legal implications, success factors, governance and tension management as well as reviewing the SC perspectives of coopetition.

The review uncovered that while the study of coopetition is maturing, there are still several gaps in studies that need to be filled. For instance, the review showed that coopetition could occur as an unintentional strategy, particularly where industrial regulatory bodies impose collaboration. However, the issue of unintentional coopetition has received limited attention in

literature with authors only showing how the strategy occurs. Therefore, it is essential to uncover if all the critical factors in intentional coopetition apply in a similar manner if the coopetition occurs as an unintentional strategy.

Furthermore, there is still an on-going debate in the field of coopetition regarding the most suitable manner of governing and managing the complex relationship. Regarding governance, no consensus has been reached regarding if trust, contractual agreement or the application of both techniques would provide the best performance outcome for a coopetitive endeavour. Similarly, regarding the management of coopetition, several methods have been discussed, such as the separation, integration, or utilising an independent third-party to manage the interactions. Some authors have suggested that a dedicated alliance function may be suited for effectively managing the relationship.

In addition, this chapter discussed the SC perspectives of coopetition, particularly with regards to the flexibility and agility of an SC. It was uncovered that coopetition, improves SC performance. However, what remains unclear is how SC influences the outcome of coopetition. Thus, making it essential to advance the SC knowledge by reviewing its impact on coopetition performance, both intentional and unintentional coopetition.

Having reviewed the literature on the coopetition concept, the following chapter investigates the OGI and the role of coopetition in the sector. Since the OGI is the case study for this study, it is necessary to review the industry prior to asking relevant questions.

Chapter 3: THE OIL AND GAS INDUSTRY

3.1 INTRODUCTION

The previous chapter discussed the existing literature within the coopetition study area, to aid in positioning the study within academic discourse and identifying knowledge gaps. This chapter focuses on introducing the oil and gas sector, which is the case study adopted for this study. As discussed in the research background, the UK OGI was selected as the case study for this research, following the recommendation of Sir Ian Wood (2014). However, it is essential to review the investigate the current state of the industry to uncover how the role of coopetition in the industry. A detailed review may also highlight opportunities to improve the application of the coopetition strategy in the sector.

3.2 AN OVERVIEW OF THE OIL AND GAS INDUSTRY

The Oil and Gas Industry (OGI) which is also known as the petroleum industry is primarily concerned with the production of crude oil and natural gas, which can be found in offshore areas or underground (Hussain et al., 2006). These petroleum products are the second-largest consumable natural resources in the world after water and are engrained in the daily activities of humans, making them highly significant (Nnadili, 2006; Yargin, 2008). In fact, Garbie, (2011), argues that the importance of the crude oil has led to the industry playing a huge role in national strategies and global politics; hence producing countries are investing resources to ensure the industry remains competitive. Similarly, Yargin (2008), points out that the sector contributes to wealth generation for both the Oil and Gas (OG) companies and the producing countries. Owing to the unequal distribution of OG reserves in the world, countries and companies with sizeable deposits of crude oil are amongst the richest (Nolan and Zhang, 2003). Notably, (The World Factbook, 2017), realised that about 80% of the world OG reserves are controlled by national oil companies, which shows the significance of OG products to the economies of the producing countries.

OG products are necessary for regular activities, both for domestic and commercial purpose, including, powering of machinery and plastic and fertilisers production, hence, the high demand for the products (Hussain et al., 2006; Brigs et al., 2012). The high demand for the products has therefore resulted in the high cost of production (Aspen technology, 2005). Yargin

(1991), adds that the price of OG products directly influences the costs of other commodities in the market; hence, the cost of OG should be regulated to ensure optimal prices of other products.

There has been a long history of mergers and acquisition and other organisational restructurings within the oil and gas industry, and a series of evolutionary stages and paradigm shifts in the industry (Schweitzer et al., 2011). The industry has evolved from demand-based low production to mass production resulting from an increase in demand, subsequently to lean production with the aim of controlling the oil prices and then to a more agile approach, and more recently, to sustainable oil production, aimed at remaining competitive in the global market owing to global financial crisis and unstable oil prices (Garbie, 2011). Yargin (2008) presented several examples of these changes, including Exxon Mobil, which has its origin in the United States of America and was birth from Standard Oil Company founded in 1870 by John D. Rockefeller. Exxon Mobil has undergone several transformations including a recent merger in 1999 between Exxon and Mobil. Similarly, BP, which originates in the United Kingdom, has also undergone a series of transformation including a merger among British Petroleum, Amoco and Arco in 2000. Another example is Royal Dutch Shell, whose origin can be traced back to companies with British and Netherland roots, i.e. there was a merger between Royal Dutch Petroleum Company founded in the Netherlands in 1890, and Shell, a former Trading and Transportation Company, founded in the United Kingdom in 1897.

3.3 THE OIL AND GAS SUPPLY CHAIN

The oil and gas have a complex supply chain involving several activities from the oil fields to the final products. The OG-SC generally consists of upstream, midstream and downstream operations, which is similar to the SC structure of other industries (suppliers, producers and customers) (Peters and Hood, 2000). The OG-SC differs from the SC of other sectors as it has a very complex upstream and there are also intermediate markets, where crude or its products can be bought or sold between the levels, i.e. between upstream production and final retail delivery (Brigs et al., 2012). Another difference between the OG-SC and other SC is its mode of organisation in the upstream sector, in crude oil extraction. The structure of the OG upstream sector is discrete in comparison with other SC, as the OG-SC including independent operations, beginning with exploration involved in trading and extending to a variable mode of transportation, which depends on sources to the refining process (Garbie, 2011).

OGI is involved in global SC, which includes national and international transportation, inventory management, requisition, material handling import/export expedition, and information technology. Therefore, the industry offers a model for effective implementation of SC techniques. Chima (2007), argues that in an SC, an organisation shares links with its upstream suppliers and distributors as materials and information flows through the supply chain. The opportunities for coordinating activities in an SC are continually improving as the quality of information and communication increases. Chima (2007), argues that primary issue plaguing the OGI is the optimisation of the available OG resources, as the industry struggles with the efficient and effective production and transformation of the resources. Garbie (2011), also adds that the uncertainties within the industry are another critical issue in the sector.

There are six significant activities within the OGI supply chain (Figure 3.1); the first activity involves the exploration and extraction of the crude oil, followed by the transportation of the crude oil which can be done either through tankers or by pipeline. The crude oil is then refined into useable products such as kerosene, diesel etc., these products are then transported to wholesale racks before being moved to retail outlets such as filling stations and later purchased by the end-users (Mansur, 2010). These activities all fall within the three primary sectors of the OGI has mentioned earlier (i.e. upstream, midstream and downstream sectors) and significant OG companies engage in exploration and extraction, transportation, refining, wholesaling and retailing of crude oil (Mansur, 2010).
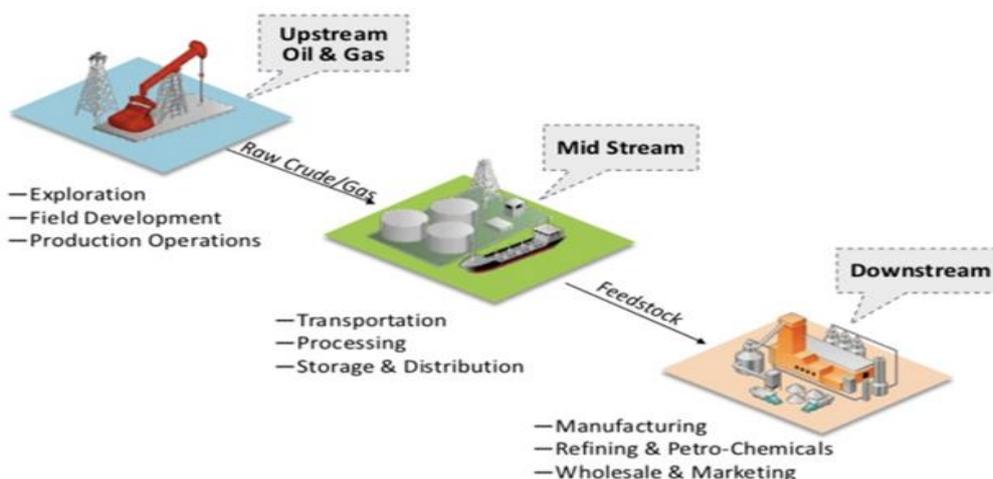
Figure 3.1: The Oil and Gas Supply Chain

Source: Joshi et al., (2017) p: 3

In line with the scope of this study which is concerned primarily with the production and exploration of crude oil, the discussion focuses on the upstream segement.

3.4 THE UK OIL AND GAS INDUSTRY

Historically, the UK has had a well-established oil and gas industry that has focused on exploring and producing petroleum from both onshore and offshore fields. The strong oil and gas industry in the country has been directly linked to its leading position in the early industrialisation and extensive research in geology. Since then, the country has registered tremendous milestones in gas and oil exploration and production. However, the exploration and production of oil and gas have been declining over the years, as demonstrated by Statista (Sönnichsen, 2020). Although this is in line with the government's goals to reach carbon neutrality by 2050, the decline has had adverse effects on the UK's economy. In 2003 the daily production was 2.2 million barrels compared to 1.1 million barrels in 2019 (Sönnichsen, 2020). The decline in production is continuing when more companies and people are being issued with licenses every year. According to Statista's report, the amount of oil reserves in the UK as of 2019 was 2.7 billion barrels, which dropped from 4.5 billion barrels in 1995 (Sönnichsen, 2020). Perhaps this explains why the UK has switched from net exporter of oil and gas to net importer as discussed by (Hinson et al., 2020).

Exploration and production of oil and gas in the United Kingdom is guided by the Petroleum Act. The Act has granted all right to petroleum to the Crown, which then delegates this responsibility to Oil and Gas Authority (OGA) (Ashurst LLP, 2019). OGA licenses people and organisations that are deemed fit to explore and produce petroleum. It is only under the terms of the Petroleum Act and licenses issued by OGA that the search and drilling of petroleum can take place in the UK and on the UKCS (Ashurst LLP, 2019). The exploration and production are guided by various types of license, including seaward production licenses, landward production licenses, offshore innovate licenses, exploration licenses as well as traditional, promote and frontier licenses. The last three licenses have ceased to be issued, but they are still in existence. OGA issues competing licenses every year, permitting more persons and companies to join the upstream segment of the industry. Unlike in many countries, in the United Kingdom, there is no national oil company that directly engages in oil and gas exploration and production activities. The exploration and production of oil and gas in the country is strictly regulated by the licenses, work performance and work programmes approval requirements.

However, the Secretary of State is permitted the country's Energy Act 2016 to stop or regulate oil and gas production in the event of a threatened or actual emergency that will affect the supply of fuel in the UK.

Commonly abbreviated as UKCS, the United Kingdom Continental Shelf refers to an area owned and regulated by the UK Government. It is the water region surrounding the UK, where it claims mineral rights (Shingler, 2016). It is primarily the North Sea area. The area is vital for oil and gas exploration, production and development since the 1960s after the issuance of the first license by the UK Government. The Continental Shelf Act was signed in 1964, detailing the licensing terms that companies should follow while applying for licenses to explore and produce oil in the North Sea. The Act facilitated the issuance of 53 licenses in the first round in 1964, and since then 28 offshore licensing rounds have been covered with the last one taking place in 2014. With continued exploration, development and production, UKCS and particularly in the North Sea have become one of the most technologically advanced areas (Shingler, 2016). However, competition and reduced oil prices over the years have reduced the growth and development of the area. Today, UKCS is slowly losing its strength in exploration and production of oil. This has been caused by difficulties to find new commercial reserves (Shingler, 2016). As a result, there has been a significant decline in the exploration and production of oil and gas in the last 20 years.

UKCS comprises of various stakeholders, including Oil and Gas Authority, UK Government, gas companies, technology organisations, societal stakeholders, supply chain, investors and wide UK industrial sectors (OGA Authority, 2017). OGA plays a fundamental role in regulating and influencing the growth and development of UKCS. It is the leading regulator with the approval of the UK Government to ensure the industry is availed favourable and enabling environment to carry out trade practices. The gas companies contribution in the sector cannot be ignored since, without them, it will never exist. They are players that execute exploration and production in the industry with collaboration from technology organisations, supply chain partners, investors and wide UK industrial sectors. The societal stakeholders form part of society, and they comprise both indirect and direct partners. Customers can be placed in the list of the societal stakeholders, and they play a crucial role in the industry by providing the revenue needed to sustain gas companies in the trade.

The activities of UKCS have a significant contribution to the United Kingdom's economy. Shingler (2016) points out that UKCS has been contributing to the funding of government activities and supporting the country's economy since its initiation. For example, in the last forty years, the North Sea has been contributing to the HM Treasury. It has ensured the security of the country's petroleum products and is still doing so even when the UK's oil and gas level of production has dropped (Shingler, 2016). As a result of the extensive knowledge, experience and innovation, the sector has developed excellent professionals, including the creation of world-class expertise that has been exported in other countries. It also contributes to both employment creation and revenue to the UK Government. For example, in the report by Hinson, et al., (2020), the offshore oil and gas activities in the United Kingdom have been creating both direct and indirect employment opportunities. In 2015, the report by Oil and Gas UK estimated the UKCS sector had contributed 35 billion pounds to the country's economy (BBC News, 2015). This is in addition to that tax contribution from the sector that goes directly to the government. The government can claim three components of taxes: Ring-Fence Corporation Tax (RFCT), which is 30 per cent, Supplementary Charge (SC) which is 10 per cent and Petroleum Revenue Tax, that might be zero per cent (Oxford Institute for Energy Studies, 2019). These taxes are prone to revisions in line with the changes in the industry. The government also gains from other indirect taxes from the sector. For example, in 2016-2017 fiscal year as reported by Energy Information Administration [EIA] (2018), the UK Government earned a revenue of over GBP 1 billion from VAT, customs duties and employment for the oil and gas industry.

3.5 COLLABORATION AND COMPETITION IN THE OGI

Competition in the UKCS sector exists in some activities, with the players in the industry having a collaborative approach in other activities. For example, there have been collaborations in joint operating agreements, licensees entering, and industry initiatives (Hinson et al., 2020). It is a culture that has been going for the time, but it has been proved inefficient in the UKCS Maximizing Recovery Review led by Sir Ian Woods (Oil and Gas Authority [OGA], 2016). Wood's review finds that extending the collaborative approach to other UCKS' activities such as rig sharing, production efficiency, decommissioning, sharing access to technology and key pares, shutdown coordination, risk diversification, sharing experience and knowledge and bringing together different perspectives will be more efficient (Oil and Gas Authority [OGA],

2016). In the past, collaboration has been a general culture that has encouraged stiff competition among the players in the industry. This has led to the development of the competition law to encourage collaboration, which the industry's key leaders believes will influence regular interaction and association, leading to beneficial impact.

To foster collaboration and discourage competition, OGA has come up with provisions guiding anti-competition agreement among the players in the UKCS industry in the UK and EU. The Competition Act provide guidelines on how certain undertakings and agreements should be pursued. The agreements meant for trade associations should not distort, restrict or prevent competition between the UK and the EU Member States (Oil and Gas Authority [OGA], 2016). OGA anti-competition laws are not meant to deter the growth of UKCS sector but rather to encourage its growth and development through its key responsibilities of regulating, influencing and promoting (Energy Information Administration [EIA], 2018). The need to cultivate collaborative culture is aimed at promoting investment in UKCS and increase fuel products exports from the UK-based companies. The promotion also attracts foreign investors, encouraging the recovery of the UKCS.

3.6 COOPETITION IN THE OIL AND GAS INDUSTRY

There is a significant gap in the literature regarding the study of coopetition in the OGI. Upon a rigorous search of the literature, only a few prominent studies were found investigating how coopetition affects the OGI. One of such studies is by Ceptureanu et al. (2018a). They reviewed the behavioural pattern of coopetition in the Romanian OGI. Ceptureanu et al. (2018a) found that the potential to create value attracts OGI to adopt the coopetition concept. Also, Cepetuernu et al., (2018), found that OGIs do not necessarily favour the use of contracts in their alliances and would rather trust their partners. However, the study proved that there is a significant lack of trust among the OGI partners in the industry. This contradictory result stresses the need for further investigation into the adequate governance mechanism for coopetition in the OGI.

Another study conducted by Ceptureanu et al. (2018b), studied the coopetition success factors in the oil and gas distribution network. Ceptureanu et al. (2018b), concludes that one of the significant drawbacks of adopting coopetition in the industry is the ability to manage the

tensions in alliance. Therefore, this study seeks to explore the UK OGI on adequate tension management techniques to promote the adoption of coopetition within the industry.

Since the drop in the price of crude oil in 2014, the UK OGI has experienced a downturn in the industry. The lack of willingness to engage in collaborative efforts has also affected the rate of production in the industry. A study by Wood (2014), encourages the industry to promote collaboration in the industry in order to improve production and save costs. Although, coopetition may offer benefits for improving the performance in the industry. In fact, a study of coopetition in the Chinese OGI found that due to government regulations, the strategy was influential in improving the performance of the industry (Yu-Ying et al., 2013). This study seeks to investigate the extent to which coopetition can be applicable in the industry to improve its performance.

3.7 THE RESEARCH QUESTION

Following an extensive review of management literature concerning coopetition, its various forms of occurrence, success factors, governance structures and its applicability in the OGI, several gaps in knowledge were identified, and as a result, some questions were asked. This section presents the questions this study seeks to address below.

1. To what extent does coopetition already exist (intentionally and unintentionally) in the UK Oil and Gas Industry?
2. Does the flexibility of an organisation's supply chain, influence the outcome of coopetition?
3. How does the governance technique, affect coopetition performance in both deliberate and unintentional coopetition?
4. Does the use of a dedicated alliance function positively influence the outcome of intentional coopetition?
5. What are the effects of tension management capability on the outcome of unintentional coopetition by UK Oil and Gas Industry?

3.8 PROPOSED CONCEPTUAL FRAMEWORK

A conceptual framework is a structure which the researcher believes can best explain the natural progression of the phenomenon to be studied (Camp, 2001). It is linked with the concepts, empirical research and important theories used in promoting and systemizing the knowledge espoused by the researcher (Peshkin, 1993). It is the researcher's explanation of how the research problem would be explored. The conceptual framework presents an integrated way of looking at a problem under study (Liehr & Smith, 1999). In a statistical perspective, the conceptual framework describes the relationship between the main concepts of a study. It is arranged in a logical structure to provide a picture or visual display of how ideas in a study relate to one another (Grant & Osanloo, 2014).

Following the review of the literature, this study proposes a conceptual framework (Figure 3.2). This framework would help guide the research, particularly the collection of qualitative data. It should be noted that following the analysis of the qualitative data, the results, as well as other relevant theories, would be adopted in developing the final conceptual framework for this study.
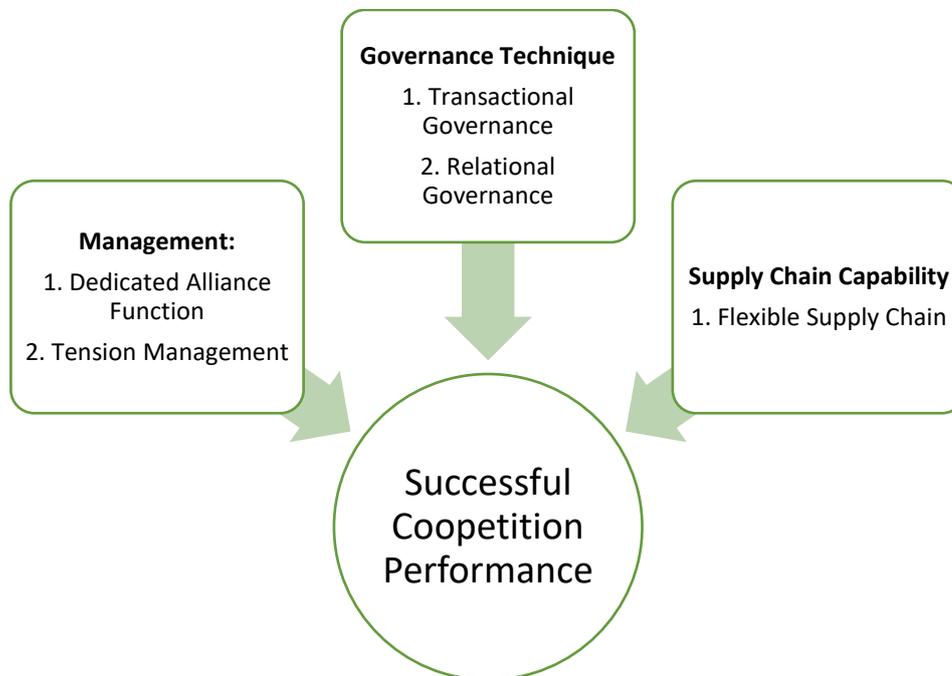
Figure 3.2: Proposed Conceptual Framework

Source: Developed for this study

3.9 CHAPTER SUMMARY

The chapter discussed the oil and gas industry, providing a general overview of the sector. The section focused specifically on the UK OGI, highlighting its impacts on the UK's economy, the stakeholders, how the UKCS evolved, as well as the collaboration and competition culture in the sector.

The review found that while the stakeholders in the industry have strongly encouraged collaboration in the sector, there are still several opportunities for improvement. Additionally, the review reinforced the need to uncover the extent of unintentional coopetition within the industry.

Following the review of the literature in both chapters 2 and 3, this chapter asked some relevant research questions and proposed a conceptual framework.

Chapter 4: RESEARCH METHODOLOGY AND DESIGN

4.1 INTRODUCTION

The previous chapter discussed the existing literature within the coopetition study area, to aid in positioning the study within academic discourse and identifying knowledge gaps. This chapter focuses on the methods used to achieve the laid-out research aim and objectives by identifying and describing the research approaches, paradigms and philosophies, including the data collection and analysis methodologies. This study set out to develop a framework to aid in successful coopetition while also understanding the extent to which coopetition exists within collaborative endeavours. It is useful to state at this point that due to the exploratory and explanatory nature of the research objectives and aim, the questions that emerged from the literature review chapter and research background, were obtained using a post-positivist paradigm, based on the abductive research approach; which was facilitated by the surplus data on coopetition. Notably, some of the research questions can be answered through a qualitative understanding of the construct; for example, research question 1 of the study requires a qualitative means of enquiry while some of the other objectives require a quantitative approach.

Additionally, the outcome of the qualitative research is crucial as it would be instrumental in developing the conceptual framework for the study. Thus, a mixed-method approach seems appropriate to gather the necessary data to attain the research aim, while using Structural Equation Modelling (SEM), to analyse the fitness of the proposed model. This chapter, therefore, discusses and justifies the methods adopted from a theoretical and practical viewpoint.

4.2 PHILOSOPHICAL PERSPECTIVE

Research philosophy is the belief system that guides the knowledge development of a phenomenon, including data collection and analysis (Saunders et al., 2007). Thus, defining a research philosophy aids in providing a direction for the data gathering and analysis for the study and to make sense of the information attained. Similarly, Creswell (2003), stresses the importance of underpinning research strategy with research philosophies, as philosophical assumptions influence the way a phenomenon is understood, adding that the view should

remain unchanged throughout the research. Notably, Perry et al. (1997), identifies ontology, which is concerned with the nature of reality, epistemology (related with the source of knowledge) and methodology (the inquiry process) as the primary considerations in selecting the research philosophy of a study.

Several philosophies have been proposed in management literature to guide research, e.g. functionalist, objectivism, realism, constructivism. This study compares interpretivism, realism and positivism perspectives, with relation to the ontological, epistemological and methodology propositions to determine the most suitable philosophy to adopt (see summary in Table 4.1). It also considers the aim of the study in choosing the guiding principle.

- **Interpretivism**

The interpretive philosophy assumes that knowledge within the social sciences and physical sciences are different and cannot be obtained in the same manner because humans are capable of interpreting their realities based their perception, which is different from the observation from physical science (Hammersley, 2013). The interpretive paradigm is often described in the literature as a phenomenological approach (Neuman, 2011) useful in understanding people (Babbie and Mouton, 2008). Interpretivism explores the complexities of social constructs to obtain knowledge for a better understanding of the realities of existence (Babbie and Mouton, 2008). Collis and Hussey (2009), adds that interpretivism seeks to understand and interpret daily occurrences, experiences and social phenomena; it also attempts to measure the value ascribed to these concepts.

Ontologically, the interpretivists adopt a relativist perspective, where a single construct can have multiple interpretations as opposed to a single truth which can only be uncovered through measurements (Pham, 2018). This paradigm tends to acquire a robust understanding of concepts and all its accompanying complexities and uniqueness rather than focusing on generalising the knowledge for the entire population (Creswell, 2009). Lincoln (2007) opts that these multiple realities are dependent on other systems for meaning, thus making it difficult to interpret a fixed reality. Therefore, knowledge acquisition and perception are socially constructed as opposed to being determined objectively (Carson et al., 2001).

Notably, the central bias of the interpretive perspective is its subjective nature, as researchers tend to study constructs based on their interpretations, without considering the diverse

interpretations from several contexts and cultures that can exist (Hammersley, 2013). However, interpretivists stress that since a single construct can have several views and interpretations, the perspective can provide an extensive understanding of a social phenomenon (Saunders et al., 2009). Tuli (2010), adds that using methodologies such as case studies, grounded theory, the interpretive researcher can uncover realities in natural settings to have further insights about the research object.

Furthermore, from a methodological viewpoint, interpretivists leverage on qualitative interactions to investigate constructs that may otherwise not be observable, therefore, drawing knowledge from participants perception, feelings thoughts and values (Wellington and Szczerbinski, 2007). Hence, interpretivists adopt a flexible research structure capable of making sense of complex human interactions (Carson et al., 2001). Cohen et al., (2013), argue that the limitation of the interpretivism perspective is its inability to verify the outcome of the study since it focuses on the interpretation of the researcher. Finally, Mack (2010), points out that interpretivists are focused on acquiring knowledge about social realities but are not concerned with how this knowledge impacts societies or individuals, especially regarding issues such as power.

- **Positivism and Post-positivism**

The positivist paradigm gains its roots from the philosophical ideas of French philosopher August Comte, who is of the school of thought that the best means of understanding human behaviour is through observation and reason – with knowledge being attained through scientific experiments (Babbie, 2011). Thus, positivists believe that social phenomena and explanations can be investigated using natural science models (Denscombe, 2008).

Ontologically, positivists believe that knowledge is objective and quantifiable. Positivism requires that the researcher adopts a distant, neutral and non-interactive position while observing social reality, to ensure that they remain objective in the analyses and interpretation of data (Morris, 2004). As a result, Druckman (2005) concludes that positivist researchers value quantifiable data. In addition, this paradigm adopts scientific methods and systematise the process of generating knowledge using quantification to improve precision in the description of parameters and the relationships among them. In short, 'positivism is concerned with uncovering the truth and presenting it by empirical means' (Henning et al., 2004, p. 17).

Many researchers believe that the positivist paradigm has questionable assumptions. For instance, Babbie (2010) observes that while positivism assumes that social constructs can be

investigated rationally, it is not always the case, as social constructs can also be irrational. Moreover, Denzin and Lincoln (2011) argued that human nature is inherently subjective, and all aspects of social research are in some degree open to human interpretation.

Consequently, the appeal for post-positivism paradigm increased. There seems to be an on-going debate regarding the relationship between positivism and post-positivism. For instance, Creswell (2009) considers post-positivism as an extension of the positivist paradigm and not a separate philosophical view. Whereas, Hetherington (2000) insists that the post-positivist paradigm should not be regarded as a continuation of the positivist paradigm but rather as an upgrade to transcend its positivism counterpart. Regardless of its relationship to positivism, it is agreeable that post-positivism challenges the notion of a purely objective outlook on knowledge in social sciences that positivism embodies, with the belief that it is impossible to acquire knowledge only through measurement (Gratton and Jones 2014).

The post-positivist approach is more open to different methodologies, and it is not unusual to have both qualitative and quantitative methods. This paradigm accommodates researchers that believe a participant can have multiple realities as opposed to a single truth that positivism exemplifies (Creswell, 2007). Furthermore, while positivists claim that there is an objective reality to be captured and understood, post-positivism insists that there can only be an estimate of reality instead of a full grasp (De Vos et al., 2011).

The strengths of the post-positivist paradigm lie in its ability to focus on the confidence and merits of its findings as opposed to attempting to uncover an absolute truth. With regards to data collection, the researcher can employ both objective and subjective measures to discover realities.

- **Realism**

Realism is a research philosophy that accepts that reality exists independent of an observer's beliefs or perception. Researchers believe that this philosophy shares the principles of positivism and interpretivism philosophies (Cooper and Schindler, 2013). The realism viewpoint acknowledges that human's subjectivity is vital to the understanding of behavioural patterns. Saunders et al., (2009) claims the realist believes that some social forces and processes exist outside the human control, and these forces shape the belief and behavioural system. Saunders et al., (2009) further clarified that these processes and forces operate on a macro-level, while, the micro-level is the level of human beings. They believe that at the micro-level,

subjective distinct interpretations of reality are vital for a full understanding of an event or phenomenon.

Although Cooper and Schindler (2013) argued that since the external macro-level forces influence individuals, the subjective interpretations of the phenomenon are not unique. Therefore, realists need to identify the factors at a macro-level, then investigate how people interpret these factors to make sense of their circumstances.

With regards to the three fundamental philosophies (ontology, epidemiology and methodology) that underpin the various paradigms, Livesey (2001) concluded that ontologically, realist researchers believe that natural and social sciences share the same principles. They acknowledge that while empirical evidence provides a basis for valid reasoning and knowledge, it is not sufficient by itself. Hence, the primary aim of realism is to exceed the description of relationships but also discover how the relationships came to be. Epistemologically, realists insist that social reality should be understood in its totality. Finally, realists believe that a qualitative methodology, mainly interviews and focus groups, should be adopted for a reliable study.

ITEM	POSITIVISM/POST-POSITIVISM	INTERPRETIVE	REALISM
Ontology (Worldview)	Naïve realism: reality is real and apprehensible.	It involves multiple realities that have been socially constructed.	Social realities are real but imperfect and probabilistic.
Epistemology (the science of knowing)	Objectivist: findings true.	It has subjective connotation and social phenomena.	Objective but probable findings.
Methodology (the science of finding out)	Experiment/surveys: verification of hypotheses: primarily quantitative methods.	Mostly qualitative as it requires explanations and descriptions	It combines suitable methods.

Table 4.1: Summary of Research Philosophies

4.2.1 Selection and Justification of Research Philosophy

At first glance, the interpretive philosophy seems like the most suitable philosophy for this study as it allows the researcher, flexibility to understand and investigate complex social issues such as coopetition, which is the aim of this study. The subjective nature as well as the methodological implications of interpretivism, however, makes this philosophy unsuitable for

this study. Since this study aims to create a framework to promote successful coopetition, the study assumes that knowledge can be generalised for the entire population, which is not in line with the interpretive perspective (Creswell, 2009). Additionally, to understand the interaction between the coopetition themes and successful performance, it is vital to investigate the concept from a qualitative and quantitative perspective. Since the interpretive paradigm emphasises the need for qualitative methods, it is not sufficient alone to address the questions asked in this study (Saunders et al., 2009).

Even though the realist view solves the ontological concerns as it allows the researcher to observe the criteria from either a subjective or objective approach, it is unsuitable for this study as the purpose of the study is to create a generic model, which implies generalisation, and therefore adopts an objective position, consistent with the positivist philosophy. Hence, this study assumes a post-positivist approach. Since post-positivism provides the methodological flexibility as opposed to the positivist approach, which encourages quantitative methodology, the post-positivist philosophy offers a more suitable fit for this study.

Fundamentally, the post-positivist philosophy has been described as a broad viewpoint that allows theory and practice to be combined, while also accepting the researchers' motivation to the subject matter, thereby permitting different data collection techniques (Ryan, 2006). Henderson (2011), believes that pragmatism profoundly influences this philosophy. Post-positivists maintains that knowledge is socially constructed and not neutral, citing that there are multiple complex realities (Ryan, 2006). In fact, Clark (1998) believes that the reason post-positivism may thrive in management research is that, many authors seek to uncover the way subjects perceive their multiple realities. This is consistent with the purpose of this study, as information such as the factors affecting coopetition regarding emergence and management would be based on the participant's perception of the complex coopetition construct.

Methodologically, post-positivism allows the use of mixed methods, providing a more practical approach to data gathering than its positivist counterpart (Henderson, 2011). Furthermore, post-positivism encourages the use of contextual data and natural settings, to promote opportunities for solutions to research questions of interest to the researcher and not necessarily to create fixed meanings (Ryan, 2006). Primarily, post-positivism thrives on creating a balance between theoretical data and professional and personal experiences, thus promoting a personal reflection on the subject matter (Dupuis, 1999). Henderson (2011), points out that post-positivist researchers are keen on studying and observing phenomena that can lead to social change. The

location of the knowledge gathering is also vital to the outcome of the study, as this thesis aims to understand the relationships and interconnectedness that exists amongst organisations in collaboration and competition, this philosophy ensures that the researcher investigates the occurrence of coopetition without manipulations.

With regards to data gathering, the interpretive philosophy encourages the use of qualitative data, thus making it unfit for this study, the post-positivist and realist viewpoints allow the use of various data collection techniques, which is beneficial to answering the research questions. Notably, while the post-positivist accepts that the world cannot be observed from a purely objective mindset, they do not disregard a potentially objective reality. They believe that even though truth cannot be fully uncovered, it can be approximated to the best of the researcher's ability, with the mindset that the subjectivity of the researcher shapes its perception of reality (Krauss, 2006).

Similarly, the realists accept that the world cannot be observed from a purely objective mindset, because of the researcher's perception of reality influences the observation and measurement of phenomena (Collis and Hussey, 2003). The realism philosophy differs from post-positivism in its belief that the study of the observable is insincere as the world cannot be reduced to observable objects and facts (Alvesson, 2007). They also believe that there is no distinction between theory and personal experiences, and are interested instead in the complex networks of theoretical and observable elements (Alvesson, 2007). For a more robust understanding of the coopetition concept, it is essential to map the hypothetical occurrence of the construct with reality. For instance, one of the research questions aims to understand the governance mechanism of the coopetition strategy. Here, it is vital to separate theory from personal experiences to give room for more in-depth knowledge of coopetition. Thus, making the realist view unsuitable for this study.

In light of the above, post-positivism is the most appropriate approach for this research as it is essential to separate the theoretical and experience to enable the sensemaking of the emerging coopetition concept. Also, because realism rejects observing phenomena is insincere, it, therefore, makes it unsuitable for this study as the reality of coopetition needs to be observed appropriately to ensure that a reliable and applicable model is developed for implementing coopetition.

4.3 RESEARCH APPROACH

Research methods literature identifies two broad reasoning to approach investigations; inductive and deductive (Trochim, 2006). The inductive approach to research moves from the specific to general (bottom-up), using the perception of participants to create broader themes and generate theories from the interconnecting themes (Creswell and Clark, 2007). The deductive approach adopts an opposing view; it follows a 'top-down' sequence, beginning with theories and ends with either confirming or contradicting hypotheses (Creswell and Clark, 2007) (Figure 4:1). Although management researchers often class quantitative analysis with the deductive approach and qualitative with inductive, it may not always be the case; as these methods are not mutually exclusive (Trochim, 2006). Table 4.2 highlights summaries and differentiates between the two research approaches.

	INDUCTIVE	DEDUCTIVE
Logic	Known premises are used to generate untested conclusions.	When the premises are true, the conclusion must also be correct.
Generalisability	It moves from the specific to the general.	Moves from the general to the specific.
Use of Data	Data collection is used to explore a phenomenon, identify themes and patterns and create a conceptual framework.	Data collection is used to evaluate propositions or hypotheses related to an existing theory.
Theory	Theory generation and building.	Theory falsification or verification.

Table 4.2: Differences between Inductive and Deductive Approaches (Dudovskiy, 2018 p.2)

Notably, Saunders et al. (2012) discovered that there are some shortcomings with inductive and deductive reasoning. For instance, they argue that there are not enough empirical data that can be obtained to enable theory building using the inductive approach and there is a lack of clarity in the deductive method, about theory selection to test the formulated hypotheses.

Therefore, Saunders et al. (2012) suggest that a third approach, the abductive approach can address the weaknesses associated with the other two reasonings with the adoption of a pragmatic view. Dudovskiy (2018), stresses that the abduction reasoning shares some similarities with both the deductive and inductive approach, with regards to its application in making logical inferences and constructing theories. The abductive method searches for a pattern in a phenomenon and suggests a hypothesis; it begins with identifying a phenomenon and proceeds by attempting to explain the concept (Bryman and Bell, 2015).
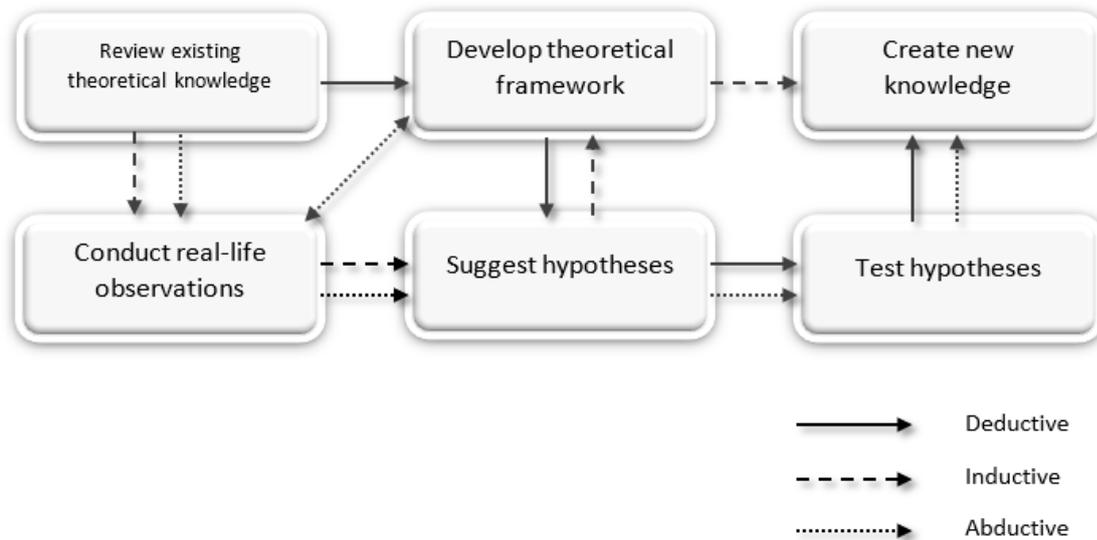
Figure 4:1: Research processes (Spens and Kovac, 2006 p. 380).

4.3.1 Selection and Justification of Research Approach

Following the discussion above, the abductive approach is the most suitable, given the explorative and explanatory nature of the study. Bryman and Bell (2015), argue that abductive reasoning is best suited in exploratory studies, as it begins with the observation of certain phenomena, which is then exploited and later verified against the observed values. Also, the abductive approach unlike the deductive and inductive reasoning, allows the explanation, development or change of theoretical frameworks before, during or after the research process; it moves back and forth between inductive and open-ended research settings to more hypothetical and deductive attempts to verify hypotheses.

Even though Dudovskiy (2018), suggested a guide to deciding on the best approach to adopt based on the availability of literature, timing available for the study and the amount of risk, he only compared between the inductive and deductive reasoning (Table 4.3). Based on the guide, the deductive approach seems to be best suited for the study because the study has access to a pool of coopetition studies with limited time for completion and little risks.

	Deductive	Inductive
Availability of literature	Plentiful	Scarce
Timing	Limited time	Unlimited time
Risk	Risk avoidance	Open to risks

Table 4.3: Choosing between deductive and inductive approach (Dudovskiy, 2018 p 3)

The deductive reasoning aims at confirming theories or hypotheses, which is applicable in the study, whereas, the inductive is useful for exploratory studies. This study is primarily exploratory and aims to confirm some hypothesis; which requires the flexibility of both approaches to achieve its aim; thus, the abduction reasoning is most appropriate.

Abduction shows something may be, without proving it, whereas deduction shows something is true in a specific case. Abductive inferences are plausible but are not justified by the structure of the argument, but reasonable enough to move a project forward (Saunders et al., 2012). Abduction results in a new order that takes surprising observations and offers a way to make sense of them, which is in line with the aim of the study of creating a framework that allows interested parties successfully engage in a coopetitive relationship.

4.4 RESEARCH METHODOLOGY

The research methodology is a systematic way to solve a problem. Kothari (2004) argues that research methodology is the science of studying how to conduct research. The research methodology is the plan that states the procedure in which a study would be investigated, including the explanation, description and prediction of the phenomena being studied. In simpler terms, research methodology considers the methods in which knowledge is acquired (Myers, 2019).

The two primary classifications of research methodology are: qualitative and quantitative. These classifications, on the one hand, refers to the nature of knowledge, i.e. the way the world is perceived and the purpose of the research. On the other hand, the classification represents the way data is gathered and analysed and the type of generalisation and interpretation derived from the data.

It is important to note that qualitative research methodology was developed in social sciences to aid in the study of social occurrences, while the quantitative research design was developed in natural sciences to understand natural phenomena (Table 4.4 below summarises and

differentiates qualitative and quantitative research methodology). It should be noted that neither of these methodologies is superior to the other, but choices between them are made based on the aim or purpose and nature of the study. Besides, both methodologies can be applied simultaneously to a study; this is called mixed methods. Based on the methodological foundation of the research, mixed methods may be used to take advantage of the differences between the two approaches (Brysman and Burgess, 1999).

QUANTITATIVE	QUALITATIVE
Gives numerical and statistical analyses of the study in other to test hypotheses or make predictions.	Possesses little desire to generalise or make predictions; it is concerned with the nature of what is being studied.
Represents data numerically and can be quantified.	The representation of data is with words, themes or patterns.
Researchers know what they are looking to find.	Researchers go into the study with an unclear idea of what their findings would be.
All aspects of the research would have been understood and designed before data is collected.	As the research progresses, the data required and the details of the study may change.
Takes into larger pictures into consideration as it generalises.	Focuses on investigating specific details of an event.
The researcher may be separate from the subject matter.	The researcher is usually immense in the subject matter.
Data collection is structured (non-random).	Data are collected randomly.
Data collected are fewer, which may lead to generalisation.	Data collected may contain a lot of detail.
It discusses issues with an objective approach to research.	Takes a subjective approach when discussing research.

Table 4.4: Differences between qualitative and quantitative research (Dolowitz et al., 2008, pp. 36).

4.4.1 Mixed Methods

Mixed methods is a research strategy that combines more than one type of research method, mainly, quantitative and qualitative methods to answer the research questions (Bryman, 2016). Basically, this research method integrates the quantitative and qualitative methods to collect and analyse data in a single study to achieve the research aim. In similar terms, Brannen (2005), argues that mixed methods combine more than one research methods, claiming that the technique can be a mix of qualitative methods, a mix of quantitative methods, or a combination of qualitative and quantitive methods. Thus, rather than adopt a single approach, two methods can be used to create a more suitable plan of investigation, and it may involve using different types of data (Bryman, 2016). It has been argued that the mixed-method research approach is usually adopted to compensate for the shortcomings of the individual methods; hence, allowing

the researcher combine certain types of qualitative methods such as interviews, with surveys or questionnaire a form of a quantitative approach (Barbour, 2014).

Types of Mixed Methods

Methodologists in the mixed methods research area have attempted to classify the various types of mixed methods design. In fact, over 40 different forms of mixed method design have been identified in mixed-method literature (Tashakkori and Teddlie, 2003). However, Creswell et al. (2003), classified mixed-methods designs into four major categories based on their functionality; they include triangulation design, embedded design, explanatory design and exploratory design.

Triangulation Design: This design has been described as the most common approach to mixed methods research (Creswell et al., 2003). According to Morse (2003), the primary aim of this design is to gather different but complementary data on the same study to improve the understanding of the phenomena. Notably, it was agreed that this design is suitable when directly comparing quantitative statistical data with qualitative data or attempting to validate quantitative data with qualitative results (Creswell et al., 2006).

Embedded Design: In this mixed-method design, it is assumed that one set of data is insufficient to answer the various questions that need to be addressed in research. Hence, a different data set is adapted to provide support based on the other primary data type (Creswell, 2003). This type of design is suitable when there is a need to include a qualitative or quantitative data within a primarily quantitative or qualitative study (Creswell, 2006).

Explanatory Design: This is a two-phase mixed methods design, with the primary purpose of using qualitative data to expand on the results of the initial quantitative data (Creswell et al., 2003). According to Morse (2003), this type of design is appropriate when there is a need to adopt qualitative data to explain the results of a quantitative data or when a study needs to create subgroups to follow up qualitatively the outcome of initial quantitative research. Tashakkori and Teddlie (1998) also added that this design could be adopted as a purposeful sampling method for a qualitative phase based on the results of quantitative participants.

Exploratory Design: This design is also two-phased, and its primary purpose is to use the result of the first qualitative method to inform the second (quantitative) phase (Creswell, 2006). This study assumes that an exploration of the subject area is useful when there are no guiding framework or theory, and there are unknown variables. Also, Creswell (2003) suggests that

since this design begins with qualitative research, it is most appropriate when there is a need to explore a phenomenon. Furthermore, Creswell (2006) states that this design should be adopted to identify significant variables that should be studied quantitatively, mainly when some of the variables are unknown.

4.4.2 Selection and Justification of Research Methodology

The mixed-methods provides the most suitable approach for this study. Given the aim of this study, which involves understanding the nature of IORs in OGI and then testing the framework for successful intentional and unintentional coopetition in the industry, it is necessary to adopt multiple methods of inquiry. Using the qualitative and quantitative approach in this study is advantageous as it would aid in the data evaluation to produce more reliable data; because of the way these approaches complement each other (Tashakkori et al., 2000). Existing research on coopetition utilises either robust qualitative methodologies such as interviews and ethnography or quantitative methods such as surveys. The mixed-method approach is suggested to enhance research on coopetition by providing a more thorough explanation of the subject matter. This approach goes, in line with Brewer and Hunter's (1989) theory that suggests that mixed-method of data collection and evaluation produces complementary strengths to overlap the weaknesses of a single approach. In fact, researchers argue that when both qualitative and quantitative methodologies are combined, the contributions of both methods are highlighted in the results of the research, thus improving the quality of the study (Nau, 1995). Similarly, Hammersley (1993) concludes that qualitative data enhances quantitative research to produce a more detailed understanding of the phenomena. It should also be noted that mixed methods can be applied at several stages of a study, from the nature of the inquiry to the collection and interpretation of the data (Tashakkori et al., 2000).

One of the primary factors to consider when adopting a mixed-method approach is the prioritisation and sequence of information gathering and evaluation (Tashakkori et al., 2000), and selecting the appropriate order can be difficult. As mentioned, there are four major types of mixed methods (Creswell, 2003). As a result of the primarily exploratory nature of this study, the exploratory design form of mixed methods is adopted.

In order to implement the exploratory mixed-method research, Creswell et al. (2007) suggest that some methodological issues should be considered. They highlight three primary decisions to be made to aid in the selection of the mixed method typology. The choices include whether

or not the quantitative (QUAN) and qualitative (QUAL) elements would be concurrent or sequential; the weight of the methods as well as where the mixing of the techniques would occur (Figure 4:2).
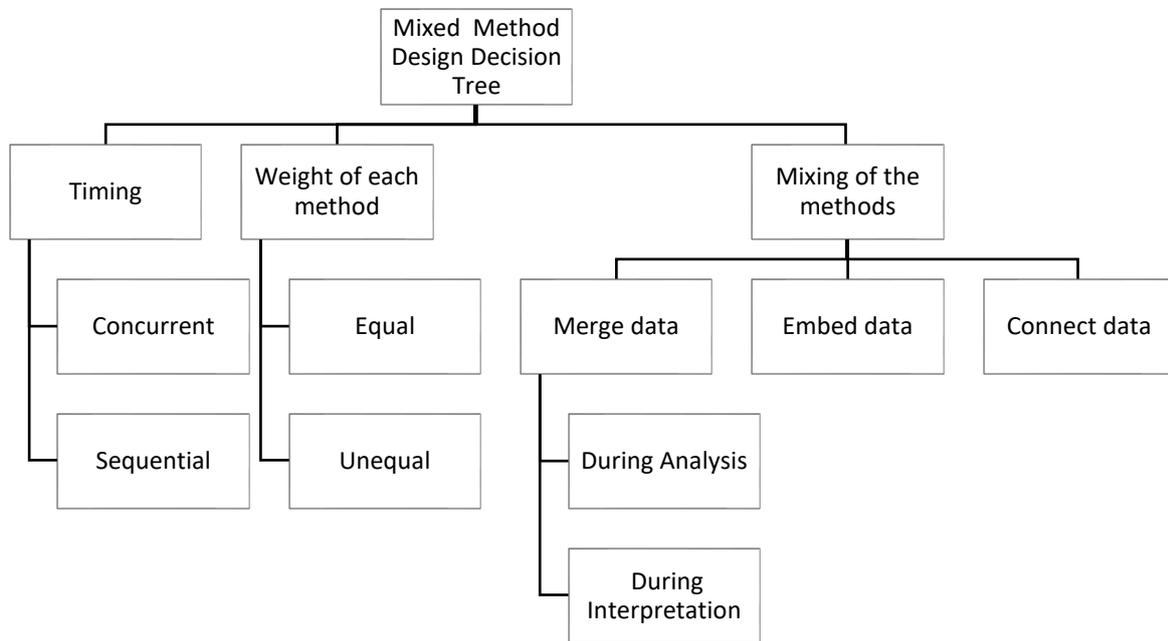
Figure 4:2: Decision tree for mixed methods design (Creswell and Plano Clark, 2007 p.247).

The exploratory design is a sequential design where the first phase, qualitative, helps in the development of the quantitative phase. Creswell et al. (2003) described this design as a sequential exploratory design. This design is used for developing and testing instruments (Instrument Development Model) or for establishing a taxonomy (Taxonomy Developmental Model). Priority is given to the quantitative entity in the instrument development model.

This study would adopt the exploratory sequential models at various phases of the study. Given the exploratory nature of the study, the exploratory instrument development model appears as the most suitable method.
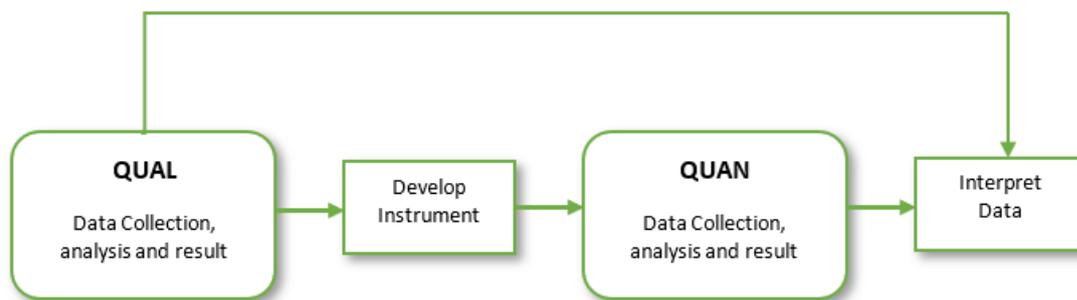
Figure 4:3: Mixed-method design (adapted from: Creswell and Plano Clark, 2007)

The first set of data is the concept clarification. Meleis (2007) insists that when a concept is widely used without an explicit agreement of its meaning, a concept clarification should be carried out. Even though the primary logic behind coopetition has been established (Brandenburger and Nalebuff, 2000), there are several accounts of the critical coopetition elements. Hence, a concept clarification was used to ascertain the appropriateness and context in which some of the coopetition elements were used in this study.

Given that the coopetition is still emerging, and as such, the number of publications is limited and comprehensive data especially with relation to understanding its application and extent of the practice in the OGI, there was a need to explain the phenomenon. Hence, the concept was investigated inductively, in line with the post-positivist research paradigm, with hypotheses being made, and guide for the instrument development. This phase of data inquiry and collection used the qualitative approach. Subsequently, a quantitative assessment was conducted to test the hypotheses, (consistent with the deductive reasoning) that were developed from the QUAL (Figure 4:3).

The exploratory study based on secondary data sources that contributed to the literature review (chapter two) provided the context-specific information on the coopetitive concept. This context was crucial for the development of the concept clarification interview questions and the initial QUAL study. The QUAL study was instrumental in developing the conceptual framework, hypothesis and questionnaire design used for the QUAN research.

4.5 FRAMEWORK FOR RESEARCH DESIGN

Following the identification and selection of the relevant research paradigm and research approach the study would adopt, a suitable research design framework to guide in data collection should be developed (Saunders et al., 2009). Henn et al. (2006) described the research design as the plan or strategy adopted to shape the investigation. This design covers the entire study from the conceptualisation of the research problem to framing the research questions, including collecting, analysing and interpreting data, to the writing up phase (Creswell, 2007).

This study adopted the research design framework provided by Sekaran (2009) (Figure 4:4). This framework covers the elements of good research design through a logical sequence of rational decision-making choices. The selection and justification of the research design are discussed at the end of the section.
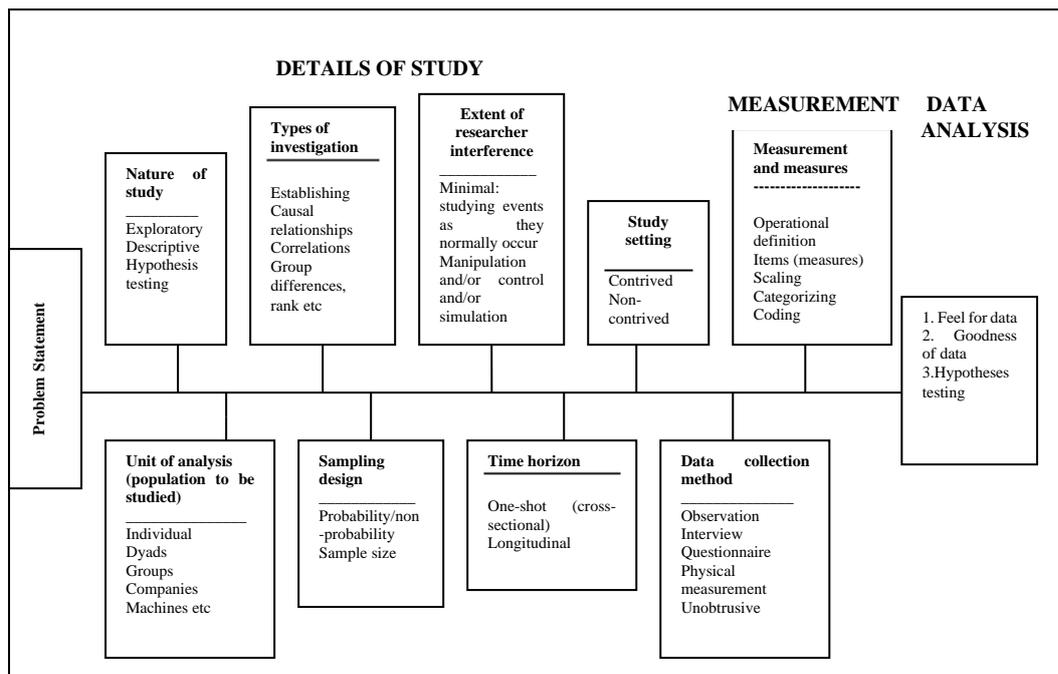

Figure 4:4: Framework for research design

Source: Sekaran (2009 p. 183)

4.5.1 Summary of Research Design Strategies

This section adopts Sekeran (1993)'s research design framework (Figure 4:4) to create a blueprint to guide the empirical investigation for the study. Figure 4:5 shows a summary of the research design adopted for this study.

DETAILS OF STUDY

MEASUREMENT DATA ANALYSIS

Problem Statement

Nature of study

Exploratory
Explanatory

Types of investigation

Correlations
Group (Non-Casual)

Extent of researcher interference

No Interference

Study setting

Non-contrived

Measurement and measures

Ordinal, Scaling
Coding

1. Feel for data
2. Goodness of data
3. Hypotheses testing

Unit of analysis (population to be studied)

Individual

Sampling design

Probability and non-probability
Sample size

Time horizon

Cross- Sectional

Data collection method

Interview
Questionnaire

Figure 4:5 Summary of research design.

This research combines the exploratory and explanatory approach. Owing to the emerging nature of the coopetition concept, especially in the supply chain subject area, where there is a noticeable gap in knowledge, an exploration of the possibilities and application is appropriate. In line with the aim of exploratory studies, this research deductively identifies the gap in knowledge, clarifies the coopetition concepts and develop hypotheses. This research carefully tests its suggested hypotheses using the explanatory approach to answer questions such as the relationship that exists between the governance mechanism adopted and the performance outcome before concluding. Also, this study adopts a correlational, non-contrived investigation, with no interference from the researcher to identify the essential coopetition elements required to ensure a successful relationship within the supply chain field.

Furthermore, the unit of analysis for all the phases are individual. In the qualitative aspect of the research, the unit of analysis is the individual based on the previous experiences and perception of scholars and industry experts with regards to the elements of coopetition. In the second phase, the unit of analysis is individual, based on the opinions and experiences of industry experts familiar with the nature of IORs and the factors that can promote successful coopetition.

Additionally, this is a cross-sectional study, where the exploratory phase involved reviewing secondary data to inform the theoretical foundation of the research. Subsequently, the

information obtained from the literature review were used to create a survey for further investigation of the subject matter through interviews and questionnaires.

With regards to the sampling techniques, since three sets of data are collected in this study, two primary sampling techniques are utilised. For the qualitative sampling, which comprises of the initial concept clarification interviews and the qualitative interviews to develop the conceptual framework and design the quantitative instrument – the non-probability *convenience sampling* is adopted for the conceptual interviews while *purposive sampling* is used for the qualitative interview. The probability - *random sampling* is utilised for the quantitative approach. Research participants for the concept clarification phase of the study are selected based on their availability, willingness to participate in the research and prior knowledge of IORs; to assist in effectively conceptualising the subject matter which is per Saunders et al. (2012) stance that convenience sampling is useful for gaining initial primary data for specific issues. The qualitative interview recruited participants based on three primary criteria; their employment in the OGI, the number of years they have been involved in a management role, and prior involvement in at least one form of IOR. The quantitative data is gathered using a web-based survey, to OGCs in the UK, and some carefully selected individuals recruited from LinkedIn a social networking platform.

This study adopts the use of primary and secondary data sources. The secondary data provided a cost-effective means of exploring the coopetition concepts, to develop hypotheses and obtain a sound theoretical underpinning for the study. However, one of the drawbacks of using secondary sources in this study is the limited number of already existing data; this was mitigated by conducting primary studies after hypotheses were developed.

Selection of Primary Data Strategy

According to Yin (2017), the strategy adopted for primary data collection should be based on (Table 4.5); the type of research questions posed, the extent of control the research has over the research subjects or events and the timeline of the study (i.e. contemporary, futuristic or historical).

Strategy	Form of Research Questions	Requires control over behavioural event?	Focuses on contemporary events?	Suitable for this research study?
Experiment	How, why	Yes	Yes	No

Survey	Who, what, where, how many, how much	No	Yes	Yes
Archival analysis	Who, what, where, how many, how much	No	Yes/no	No
History	How, why	No	No	No
Case study	How, why	No	Yes	Yes

Table 4.5: Relevant situation for research Strategies (adapted from: Yin 2017)

In light of the above table, the primary data was conducted using surveys and case studies.

Case study strategy for this research

This research utilises the case study approach as an extension of an exploratory study that included the literature review. The literature review provided some insights into the factors surrounding coopetition and how they can impact the oil and gas industry. The case study aimed to strengthen the findings by providing a more holistic view of the oil and gas industry, taking into account the current nature of the industry and the various sections (Operators and Contractors) especially in the upstream sector. The UK OGI was selected for the case study for two primary reasons:

1. The Wood Review (2014) suggests that in order to optimise productivity, collaboration among the key players should be encouraged. This study seeks to review if coopetition may provide a more suitable strategy to improve productivity in the OGI; hence, this study investigates the impacts of coopetition within the oil and gas industry.

2. The UK OGI has been described as the oil and gas capital of Europe, due to its world-class infrastructure and SC capabilities; therefore, understanding how coopetition can be applicable in the industry can be translated to other OG producing countries in Europe and other oil-producing countries.

For this research, the sources of evidence came from documentation of various sources such as documented reports of events and specific newspaper clippings and other similar articles appearing within the mass media channels and archival records survey data by previous studies. Inspiration was drawn from Wood Review (2014) on the optimisation of productivity where collaboration was encouraged in a highly competitive industry. In this study, the UK oil and gas industry is the case study. For the qualitative aspect, individual members of the OGI are selected using the purposive sampling method, while the quantitative phase adopts a random sampling to select members of the industry to test the conceptual framework.

Survey research

Survey research is one of the most significant areas of measurement in applied social research as it often used to assess thoughts and feelings about a subject matter. The broad scope of survey research covers any measurement procedures that involve asking respondents a series of questions. This may be anything from a brief paper-and-pencil feedback form to a long and intensive one-on-one in-depth interview with a respondent. Surveys can be broadly classified into two categories - questionnaires and interviews.

Interviews

An interview is a determined conversation or discussion between two or more people where the interviewer aims to understand a particular event or phenomena, thereby asking questions which the person(s) being interviewed answers willingly and also listens to the interviewer (Saunders et al., 2009). Similarly, Silverman (2010) defines an interview as a person to person interaction, which involves two or more people and is conducted to achieve a particular purpose. Table 4.6 highlights the strengths and weaknesses of adopting interviews in data collection. This study uses interviews to collect qualitative data. The researcher has chosen to use interviews because it provides the opportunity to explore and obtain insights from industry experts about the nature of coopetition in the OGI which is relevant to the aim and objectives of the study.

Uses and Strengths	Limitations and Weaknesses
Gives an in-depth understanding of the data collected	The obscurity of the interviewee is low
The data collected is based on the participants' understanding	Making quantitative predictions is difficult
Useful when researching on a limited amount of cases	Analysing data is usually time-consuming.
Useful when describing complex phenomena	The credibility of the results may be lower than other methods
Provides peoples' personal understanding and description of events	
Useful in studying dynamic process (documenting sequential patterns and change).	
The researcher can adopt the qualitative method of grounded theories to generate a tentative but explanatory theory about the event inductively	

Table 4.6: Uses and limitations of interviews. (adapted from: Tashakkori and Teddlie, 2003).

Research methods literature identifies three primary forms of interviews: structured, semi-structured and unstructured interviews (Creswell, 2003; Saunders et al., 2009; Silverman, 2010). The structured interviews, also known as standardised interviews, adopts a self-administered questionnaire to ask a set of fixed questions. The structured interview is usually adopted in quantitative studies as the information collected is measurable. This interview approach aims to ensure that each interview is conducted in the same manner, with the same questions asked in the same order. The semi-structured interviews, on the other hand, involves the use of more open-ended questions. This form of interview inquiry is less formal than structured interviews, and the interviewer follows a list of themes or possible questions to guide the discussion (Saunders et al., 2012). The questions asked in this interview may not be precisely the same in all inquiries made, as the flow of questions may change based on the length and the quality of the interview. This interview approach is useful in qualitative social research. Finally, the unstructured interview is a casual and unrehearsed discussion type. Here, the interviewer does not go into the interview session with the exact question to ask but the theme and area of discussion. It is an informal discussion which usually lasts longer than the other interview approach as an in-depth understanding of the area is paramount.

This study adopts the use of semi-structured interviews to gather qualitative data. The semi-structured interview involves a series of open-ended questions emerging from the literature review that aims to provide answers to the research questions (Greene, 2008). Due to the complex nature of coopetition, it is crucial to have the flexibility to fully explore the forms of IORs in OGIs without moving away from the theme of the inquiry (Gray, 2009).

Questionnaires

Creswell (2009) describes questionnaire as the backbone of survey research, capable of determining the outcome of a study. A questionnaire is a research instrument consisting of a series of question to gather information from respondents (Saunders et al., 2012). Questionnaires are often used to gather primary quantitative data in a standardised manner that ensures internal consistency and coherence when analysing. Questionnaires should have a definite purpose consistent with achieving the aim and objective of the study. One of the advantages of this instrument is that it is inexpensive to both design and administer. Some of the other advantages and disadvantages of the instrument are listed in Table 4.7. When

designing a questionnaire, it should be clear from the onset of how the data would be used and analysed.

Questionnaire advantages	Questionnaire limitations
- Questionnaires are less expensive than other methods - They produce quick results - Questionnaires can be completed at the respondent's convenience - They offer greater assurance of anonymity - They provide less opportunity for bias or errors caused by the presence or attitudes of the interviewer - Questionnaires are a stable, consistent and uniform measure, without variation - They give a considered and objective view on the issue - The use of questionnaires promises broader coverage since researchers can approach respondents more quickly than other methods. - They are not affected by problems of 'no-contact.'	- They do not allow probing, prompting and clarification of questions - They do not offer opportunities for motivating the respondent to participate in the survey or to answer the questions - The identity of the respondent and the conditions under which the questionnaire was responded to are not known. Researchers are not sure whether the right person has responded to the questions. - It is not possible to check whether the question order was followed - Questionnaires do not provide an opportunity to collect additional information (e.g. through observation) while they are being completed. There is no researcher present, for instance, to make observations while the questions are being answered - Due to the lack of supervision, a partial response is quite possible

Table 4.7: Advantages and limitations of using questionnaires. (Adapted from; Sarantakos 1998).

There are four different types of questionnaire designs, which can be adopted for a study based on the purpose of the study. These are contingency questions, matrix questions, closed-ended questions and opened questions (Saunders et al., 2012). A contingency question is one that is limited to a specific subset of the respondents. It ensures that only the appropriate respondents answer the questions to improve the quality of the responses and data collected. For example, a contingency question may apply only to a specific gender. Matrix questions have one or more row items which need to be evaluated by respondents on the same column items. Matrix

questions are multiple-choice questions represented in a grid format. Close-ended questions are question types that ask respondents to choose from a distinct set of pre-defined responses, such as "yes/no" or among sets multiple-choice questions. Finally, open-ended questions are free-form survey questions that allow a respondent to answer in open text format such that they can answer based on their complete knowledge, feeling, and understanding.

When designing a questionnaire, Saunders et al. (2012) mention three considerations to make; the general form, the sequence of the questions and how the wordings of the questions. In terms of the general forms, the questionnaire can be designed in either a structured or unstructured format. Structured questionnaires have a set of standardised, predetermined questions with a fixed scheme. The questions are presented in a closed-ended format with the same wordings and the same order to all respondents. Whereas an unstructured questionnaire is not presented in a standardised format, instead, it presents a question guide, in an open-ended format, where the respondents can respond in their own words. This type of questionnaire is more suitable for qualitative studies.

Another critical consideration in questionnaire design is the sequence of the questions. Saunders et al. (2012), argues that the question sequence in a questionnaire should have a logical flow, usually from general to specific. Question sequence in questionnaire design is crucial as it can reduce bias in the responses and decreases the chances of questions being misunderstood which can compromise the quality of the survey. The first sets of questions are particularly important because they can influence the attitude of the respondents to the questionnaire. Suresh (2014), suggests the sandwich theory, which is a three-stage theory should be adopted when designing a questionnaire. The three stages and order listed by Suresh (2014) when designing questionnaires are; screening questions, to ensure that each respondent is fit for the study, questions specific to the study, and then demographic questions.

Finally, the wording of the questions should be clear and impartial to avoid creating a bias in the responses gotten. Creswell (2009), adds that questions in a questionnaire should not be ambiguous or convey more than one meaning; words with emotional connotations should also be avoided.

Questionnaires can be distributed in various forms including via the telephones, mails and through the webs. Mail questionnaires are particularly useful for surveying subjects that are geographically dispersed (Yammarino et al., 1991). This is a cost-effective method that also has another advantage. It allows respondents to take their time to participate at their discretion

and in turn, be able to provide thoughtful responses (Churchill, 1996) that are accurate (Aaker et al., 1998). Because mail questionnaires are self-administered, it also reduces the possibility of interviewer bias (Zikmund, 1999) as respondents may choose to remain anonymous through mail questionnaires. The anonymity aspect is a significant contributing factor in the honesty of responses obtained (Churchill, 1996) and especially so in the wake of particularly sensitive topics (Malhota, 1996). However, mail questionnaires tend to be more structured and lengthier, unlike other forms of survey communication, making response rates low (Zikmund, 1999). It is not recommended for detailed written responses.

This study adopts the use of questionnaires as the instrument to gather quantitative data and would be discussed in further details in chapter six of this study.

It is essential to map the the data collection method to the research questions at the point to ensure that each method selected to answer the questions are suitable and fit for purpose. Therefore, Table 4.8 maps the research questions to the data collection method.

Research Question	Methodology	Data Collection Technique
1	Qualitative	Semi Structured Interviews is used to determine the extent to which coopetition exists in the UK OGI
2	Qualitative and Quantitative	Semi-structured interviews are used to determine the respondents view of the role of the SCF in coopetition, while the questionaires are used to test its impact on the outcome on coopetition performance.
3	Qualitative and Quantitative	Semi-structured interviews are used to determine the respondents subjective view on the role of the governance mechanism in managing coopetition, while questionnaires is used to test its effectiveness.
4	Qualitative and Quantitative	Semi-structured interviews are used to determine the respondents subjective view on the role of a dedicated alliance team in managing coopetition, while questionnaires is used to test its effect on coopetition performance.
5	Qualitative and Quantitative	Semi-structured interviews are used to determine the respondents subjective view on the role of a tension

		management technique in managing coopetition, while questionnaires is used to test its effect on coopetition performance.

Table 4.8 Mapping research questions with data collection technique

Survey Strategy Employed

This study uses a questionnaire to collect data for its survey, in-line with advantages in Table 4.7 captured above. Because the study aims to provide a generic industry model, the questionnaire is the most appropriate tool. However, the survey was carefully constructed to ensure that it can overcome the weaknesses of surveys as an evaluation method and in turn, produce credible data. Furthermore, interviews were also employed in line with the advantages highlighted in Table 4.6 to develop the hypothesis and questionnaires. Figure 4:6 below gives a summary of the data collection design for the study.
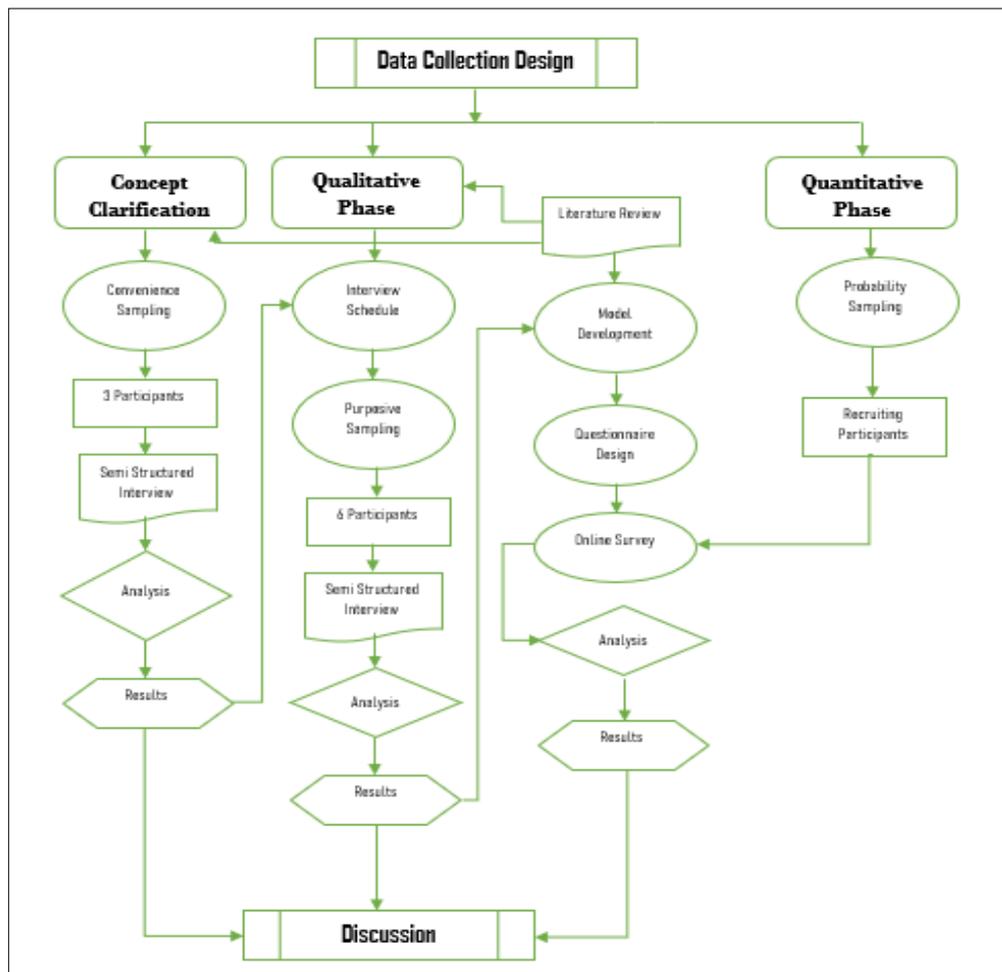

Figure 4:6: Data Collection Design (Developed for this study)

The data collection method has been discussed and justified in this section; these methods would be discussed further in the data presentation sections for the respective data. As identified in the process map (Figure 4:6), the discussion chapter would review the results of all the data collected and its implication for the study.

4.6 AN OVERVIEW OF STRUCTURAL EQUATION MODELLING TECHNIQUE (SEM)

An overview of SEM is presented in this chapter, which precedes the presentation of the results to allow the reader to appreciate the SEM technique and understand its application to the results. It would discuss the measurement and path relationships and the way they are treated in SEM analysis; it would also review hypothesis testing, the SEM assumptions and the factors to be considered during SEM analysis.

Structural Equation Modelling (SEM) which is also known as covariance structure modelling, covariance structure analysis, correlation structure analysis or causal modelling is a term that describes several statistical methods which is primarily used to assess the relationships between variables in a theoretical model especially multi-variant models (Arbuckle, 2016; Bryne, 2016; Hu and Bentler, 1999). SEM has been described as a hybrid between factor analysis and path analysis, which offers explanations for hypothesised correlations between constructs in a theoretical model; thus, providing researchers with a means to both analyse their data and test their hypotheses (Bryne, 2016).

Hence, SEM is a popular choice for testing hypothesis and analysing relationships involving various constructs and their underlying indicators in many social science studies (Arbuckle, 2016). For instance, SEM is the recommended tool to assess the cause-effect relationship between latent constructs in business research (Hair et al., 2011).

SEM integrates several statistical techniques such as multi-level modelling, measurement theory, path analysis, factor analysis, multiple regression, non-recursive modelling, simultaneous equation modelling to analyse and draw conclusions from a theoretical model (Arbuckle, 2016). It is important to note that in SEM analysis, there are some assumptions that need to be met to attain acceptable model fit before the approach can be used to reliably test hypothesis and confirm theories, violating the required assumptions can result in Type I or II error.

SEM possesses the ability to model a mean structure, a covariance matrix and moment structure to make statistical inferences about the relationships or interactions in a theoretical model (Arbuckle, 2016).

$$\bar{Y} = B_1 X_1 + B_2 X_2 + \cdots + B_n X_n + A$$

Where

$\bar{Y}$ = Predicted score

$X_1, X_2, \ldots X_n$ = Predictors

$B_1, B_2, \ldots B_n$ = Unstandardised Regression Coefficient

A = Intercept

From the equation, $\bar{Y}$, which is the predicted score represents the weighted combination of the predictors ($X_1, X_2, \ldots X_n$), the covariance structure represents the unstandardised regression coefficients ($B_1, B_2, \ldots B_n$), and the intercept which is the constant A corresponds to the mean structure.

There are several software packages that have been developed to allow a more straightforward SEM analysis, for example, LISREL, EQS, AMOS and Mplus. Additionally, some computer programming platforms like STATISTICA can be used to compute and analyse SEM models. This study adopts the use of IBM SPSS AMOS 25 for the SEM analysis, based on availability and its user-friendly interface and analytical capabilities to model the interactions between the antecedents and outcome of coopetition.

An SEM with a latent construct is divided into two different components depending on the relationship between the latent constructs as well as between each latent construct and their indicators. These is expanded in appendix 2.

The SEM model is the most suitable data analysis technique to be adopted for this study as it allows, the researcher measure latent variables such as trust, commitment, which may otherwise have been difficult to measure. Additionally, the SEM is a useful analytical tool to test both direct and indirect relationships between two or more constructs. This capability is beneficial in this study as it is vital to measure the interacting effects of the management and

governance techniques on coopetition. Further justification for the adoption of this analysis technique is provided in chapter 6.

4.7 ETHICAL CONSIDERATION

While conducting studies in social science, including management, scholars would be faced with ethical and moral issues as a result of their interactions with humans. Therefore, the researcher needs to consider the ethical issues involved in the study, including the confidentiality and anonymity of the research subjects (Teddie and Tashakkori, 2009). The need for consent has been emphasised in management study to ensure the participants are aware of their role in a study. Therefore, the study participants recruited for the qualitative phase of the study were required to sign a consent form and provide verbal consent before the commencement of the interviews. Additionally, all participants were explicitly informed about their rights to confidentiality and that their participation was voluntary. Hence, the participants were not obliged to participate and were informed of their rights to withdraw from the study at any phase. For the quantitative data, participants sent a letter of invitation and introduction to the study, which states the rights of the respondents to refuse to participate in the study.

With regards to the constructs being investigated, there were no significant ethical issues as sensitive organisational information and processes were not required. The study sought the opinion of respondents about the coopetition construct and was expected to respond based on their individual perception. The data handling process, complied with the host university's research ethics standard, following an internal assessment by the research review board as well as the UK Data Protection Act (1998) guidelines. The letter of introduction sent to all participants in the study stated the purpose of the research and the rights of the respondents to reassure the participants of their confidentiality.

4.8 CHAPTER SUMMARY

This chapter discussed the research philosophies, approach, design and data collection technique for the study. The chapter started by providing an in-depth discussion of the various research paradigms and philosophies to provide a clear justification for the approach selected. From the review of the philosophical assumptions, this study adopts the post-positivist lens to

underpin the research, as it allows flexibility of research methodology, which is essential as this study adopts the sequential mixed-methods research design for data collection. The qualitative phase of this study comprises of a conceptual clarification interview, to ensure that the investigation is appropriately positioned in academic literature and the terms and concepts used are accurate. This is followed by a semi-structured interview, which explores the applicability of the coopetition in the OGI and develops the theories and research hypothesis, to be tested using quantitative questionnaires. This chapter also introduces the structural equation model (SEM) and the various element necessary to create a structural model, which would be used to test the hypothesis and the conceptual framework which would be developed in the next chapter. These approaches, as well as the data presentation, are discussed in subsequent chapters. The next section presents the results of the exploration phase of the study and also shows the conceptual frameworks and research hypothesis.

Chapter 5: QUALITATIVE DATA PRESENTATION AND CONCEPTUAL DESIGN

5.1 INTRODUCTION

The preceding chapter discussed and justified the research methodology and philosophical underpinnings for this study. It also provides justification for the exploratory and explanatory nature and abductive reasoning this study follows. Hence, in line with the rationale provided, this chapter presents the outcome of the exploratory research and the development of the conceptual framework following the abductive reasoning that allows hypothesis to be developed following observation of reality.

From the review of the literature and research questions presented in chapter 2, an exploration of the OGI is necessary to access the extent of coopetition practice as well as analysis how the constructs reviewed in the section, affects the performance of coopetition. Additionally, an exploration of the industry needs to be conducted to clarify how the constructs are currently being applied in the industry and how they affect coopetition to allow the development of the conceptual framework and the research hypothesis. However, the chapter starts by providing the outcome of the conceptual clarification.

5.2 CONCEPT CLARIFICATION INTERVIEWS

In research, it is crucial to ensure that the concepts under review are clearly defined to avoid unreliable measurements, which can affect the validity of the study and the instruments used to gather the data for the research. In a study conducted by Jordan (2013), it is suggested that a lack of conceptual clarity impacts the validity of the study, as it becomes difficult for the researcher to study the same phenomena in a comparable setting. Additionally, unclear concepts introduce challenges when forming and testing hypothesis, as developing a hypothesis from a concept that lacks clarity renders both the hypothesis and the results unreliable.

Conceptual clarification is particularly necessary for this study as the coopetition concept is still in its infancy stage (Dahl, 2017), and is still at risk of misinterpretation. In fact, Dagnino and Padula (2002), emphases on the need for boundaries to be created around the definition of coopetition since, there seems to be a blurry line in its conceptualisation. This further stresses the need for a clarification of concepts.

Therefore, to ensure conceptual clarity, the researcher conducted a concept clarification interview, using a semi-structured interview format following Oppenheim (1992), stance about exploring the main concepts of research prior to data collection.

The objective of the concept clarification interview is as follow:

1. To check that the concept has been appropriately defined.

2. To check that the correct terms are being used describe elements of the study.

3. To investigate the viability of the research aims and objectives.

The concept clarification interview adopts a non-probability convenience sampling technique, as it is suitable for exploratory study and the study participants can be selected based on accessibility and willingness to participate (Saunders et al., 2007).

5.2.1 Interviewees

Three interviewees were selected from the host university. The interviewees were selected based on the level of expertise within the field of supply chain and strategic management; however, the identity of the respondents cannot be revealed as per the university's ethical policy. Nonetheless, the respondents are extensively published in several areas of management research. The sample size was determined based on the availability of the respondents, as most of the interview was conducted following an ABS50 Conference in 2015, hosted by the host university as part of the celebration for its 50th anniversary.

5.2.2 The Interview

Prior to the interview, an interview schedule was emailed to the participants to allow proper reflection of the constructs being understudied and a face-to-face interview was scheduled. The interview was a short semi-structured discussion that adopted open-ended questions and lasted an average of thirty minutes. Since the concept is still in infancy, the construct was introduced along with real-life examples, such as the alliance between Sony and Samsung. After a brief period of reflection, the interviewee was asked to give an interpretation of the concept from their viewpoint. Subsequently, the researcher revealed how the construct had been defined for the study and sought the opinion of the participant for its appropriateness.

In the instance where all the participants agreed on a construct and its operational definition, the definition was maintained. However, where there was no consensus, modifications were made based on the judgement of the researcher with the backing of relevant literature.

5.2.3 The Interview Outcome

The interview data analysis reviewed that there was a consensus regarding the initial definitions and operationalisation of the constructs. This shows that the review of the literature was rigorous as the constructs were defined based on the outcome of the literature review. However, there were a few feedbacks regarding the phrasing of some of the constructs. Below are the key findings from the conceptual clarification interview.

1. All respondents agreed that the definition of coopetition is suitable for the study.

2. The participants' advice that the terms 'cooperation' and 'collaboration' should not be used interchangeably during data collection to avoid misinterpretation and confusion.

3. The terms can be used interchangeably during discussions.

4. Using Relative or Transactional governance terms during data collection may be too ambiguous. Use simpler terms to convey meaning.

These suggestions were taken on board and applied during the development of both the qualitative and quantitative questions development. For example, rather than using relational or transactional governance during the data collection, trusts and contracts were used to pass the message.

5.3 THE QUALITATIVE DATA

As identified in the literature review chapter, there are limited studies on the effects of coopetition in the oil and gas industry. Agreeably, several studies show that coopetition is a useful strategy for improving supply chain performances (Kovacs and Spens, 2013), innovativeness (McCarthy et al., 2018), risk management (Cygler et al., 2018) and overall business performance (Robert et al., 2018). Some studies have even investigated the impacts of the coopetition strategy on several industries such as tourism, telecommunications, manufacturing, winemaking, automobile industries (Crick, 2018; Akpinar and Vincze, 2016; Mariani, 2015; Yami and Nemeh, 2014; Ehrenmann and Reiss, 2012). Within the OGI,

Ceptureanu et al., (2018) ranked the critical success factors based on the factors identified by (Chin et al., 2008); however, no studies have explicitly reviewed the application of coopetition in the OGI with regards to its governance and management structures. There is also a knowledge gap bridging SC and coopetition, especially reviewing the effects they have on each other. Hence, questions regarding the impact of a flexible supply chain on the outcome of coopetition would be investigated. Therefore, the need for an exploratory study to answer some of the research questions identified in the preceding chapter becomes necessary.

As identified in section 4.5, the goal of an exploratory study is to investigate a new phenomenon and try to make sense and clarify new constructs (Creswell, 2003). While coopetition has been studied for almost two decades now, there are still many questions that need answers, and this study attempts to investigate the effect of SCF on the outcome of coopetition performance in the OGI. Since no previous studies focus on the oil and gas industry, exploratory research becomes necessary.

In line with exploratory studies, qualitative research supports using non-numeric data to make sense or interpret a phenomenon (Creswell, 2014). Essentially, qualitative research is interested in understanding a construct from the participant's viewpoint, by developing a close proximal relationship, thus being immersed in the research context (Sandelowski, 2010). This method is in line with the post-positivism philosophy that encourages the subjectivity, allowing the researcher to have a deeper understanding of the role and perception of coopetition as a strategy for growth in the OGI. To uncover how coopetition can impact on OG supply chains, the researcher, needs to understand the industry and the way it operates currently, as well as revealing the perception of the practicality and applicability of the coopetition strategy from the respondent's viewpoint. Therefore, this phase of the study is concerned with exploring the subjective view of industry professionals regarding the issue of coopetition, mainly to understand the extent of its application. The outcome of this phase would be beneficial in designing the instruments for the quantitative study.

5.3.1 The Research Question
Following the review of literature, some critical questions were identified, (see section 3.7), this phase seeks to answer, two crucial questions

- *To what extent does coopetition already exist (intentionally and unintentionally) in the UK Oil and Gas Industry?*

- *Does the flexibility of an organisation's supply chain, influence the outcome of coopetition?*

The objectives of this phase of the study are:

1. To test the awareness of coopetition, as a term and as a practice.

2. To investigate the extent coopetition practices exists within the industry.

3. To understand the role and form of governance and management of IORs in the industry.

4. To explore the impacts of SCF on the outcomes of IORs in the industry.

5. To develop the conceptual framework and to aid in developing the tool for the quantitative phase.

Since there are limited coopetition studies in the OGI, the qualitative phase helps set the scene for the quantitative research, and the results would be advantageous in developing and modifying the instruments for the quantitative phase. For instance, to create additional questions for further review to aid in achieving a deeper understanding of the construct (Bryman, 2015). It should be noted that this section only presents and analyses the qualitative data to aid in developing the quantitative phase. Discussions about the key findings of this phase would be done in the discussion chapter 8.

The interview adopted an interview schedule (see appendix) to guide the study separate from the model, to reduce the risk of researchers' bias, particularly confirmatory bias. In addition, during the interview process, the researcher did not offer too many details about the coopetition concept (unless when probed), to allow the researcher capture data regarding the extent of unawareness of coopetition. Thus, the questions were formed from an information requirement log (see appendix) created following the review of the literature to guide the data collection. (Figure 5:1) shows an overview of the qualitative phase of this study.
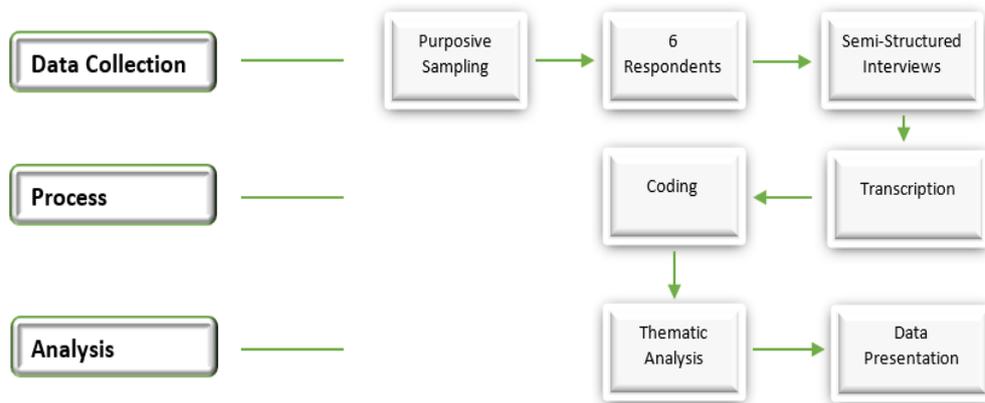
Figure 5:1: An Overview of the Qualitative Study (developed for this study)

5.3.2 Qualitative Data: Data Collection and Analysis Process

This section follows from section 4.5 of this chapter regarding sampling techniques, where it was identified that the purposive non-probability sampling technique would be utilised for the qualitative data collection. This sampling approach allows the researcher to select respondents that are crucial to meeting the objectives of the study. In this study, the appropriate audience is individuals who are:

1. Employed within the Oil and Gas Industry.

2. Employed within a management role or capable of influencing management decisions.

3. Have been involved in a SC or Business Development role for a minimum of 7 years.

4. Have had first-hand active working experience in any form of inter-organisational interaction.

The reasons for these criteria are to ensure that the respondents, understand the industry which this study is based (OGI), are familiar with SC terminologies and positioning in the industry and are accustomed to the dynamics of IO interactions. According to Bogner et al. (2009), the conditions for determining expertise is not iron cast; however, factors such as track records, length and quality of career, credentials, and reliability can provide insights about the proficiency of a participant. This study, therefore, adopts the period of career role to determine expertise, based on the assumption that seven years is enough time to acquire sufficient knowledge about the supply chain function.

Since there is no industry database to select participants, research respondents were sourced through networking. Contacts were established with two of the respondents at an annual Supply Chain Forum held at the host university, three respondents were sourced from LinkedIn, a social networking platform for professionals, while another respondent referred one respondent. The strategy for sourcing respondents described is consistent with Patton (2002)'s opportunistic sampling technique, where he suggests that researches can take advantage of events or conferences and other opportunities to gather data.

Participant	Job Role	Type OG of Organisation	Years of SC experience	Management Level	IO Interactions
Res_01	SC & Procurement Manager	OG Operator	24	Senior Level	Suppliers
Res_02	Business Owner/ Business Development	OG Servicing	40	Owner	Complementary Organisation
Res_03	Business Owner/ Contractor	OG Servicing	25	Owner	Complementary Organisation
Res_04	SC Manager	OG Operator	12	Senior Level	Suppliers
Res_05	Regional SC Manager	OG Servicing	15	Senior Level	Complementary and Competing Organisation
Res_06	Business Owner/Contractor	OG Servicing	35	Owner	Complementary and Competing Organisation

Table 5:1: Profile of Interview Participants

Following initial contact, a participant information sheet containing the interview schedule and consent forms (see appendix) was sent by email to the respondents upon confirming their interest in the study. Follow-up interactions were made, by email and telephone conversations to schedule the date, time and location of the interviews.

The concept of saturation was utilised to select an appropriate sample size since there are no agreed rules about the number of optimal participants in qualitative research. The idea of saturation which is described as a stage where no new information is being gathered from a study is used to estimate sample size in qualitative research (O'Reilly and Parker, 2013; Charmaz, 2006). Thus, six respondents were interviewed based on the criteria specified for the purposive sampling (Table 5:1).

Another critical aspect of data collection in qualitative research is regarding the data collection instrument. Some of the tools that can be applied for qualitative data gathering are observations, focus groups and interviews (Bryman, 2015). This study could not adopt the observation technique, as the research questions involve investigating the views of the experts about a construct, which is not related to the behavioural patterns of the participants (Bryman, 2015).

Interviews were chosen for this study above, focus groups based on convenience. Due to the limiting criteria of the research participants, it would have been challenging to gather the respondents together at the same time owing to conflicting schedules and logistical limitations. Additionally, owing to the criteria of IO interactions, to investigate the awareness and extent of unintentional coopetition, it was essential to have detailed information about the dynamics of the IO alliance, which may not have possible with focus group technique.

Based on Section 4.5 discussing the types of interviews in qualitative studies, this study adopts the semi-structured interview technique because it allows for flexibility in the survey, while still retaining focus on the objectives of the study which may not be possible with structured or unstructured interviews. An interview schedule consisting of four primary stages was developed to guide the discussion. The questions were asked in a manner that allowed the participants to express their views without constraints. This technique allowed the researcher to identify and explore themes that had not been considered during the development of the interview schedule.

According to Corbin and Strauss (2015), the technique of analysing qualitative data should be informed by the objectives of the study. Hence, this study compared textual data for similarities and differences in the identified themes from the participant's viewpoint. To achieve the study objective, the analyse process first explored each participant views on a case by case basis, followed by a comparison of the common themes across cases (Gibbs 2007; Ayres et al., 2003).

This study did not adopt the use of computer-assisted qualitative data analysis (CAQDAS). Even though it has been argued that CAQDAS enhances qualitative data management and analysis by increasing the efficiency and effectiveness of the data analysis process (Bazeley & Jackson, 2013), the issue of the efficacy towards the understanding of the research data becomes arguable. Richards and Richards (1994), argue that CAQDAS cannot understand the nuances of the meaning of a text, which is against the goal of a qualitative study to holistically understand the experience and opinions of the participant. Gilbert (2002), also adds that CAQDAS increases the gap between the researcher and the data, reducing familiarity with the data. Nevertheless, Richard (2014) points out that irrespective of the data analysis approach utilised in a qualitative study, the aim of understanding the participant's perception of reality remains intact. This study adopts the manual method of qualitative data analysis, by manually transcribing, coding and thematically analysing the data. Saunders et al., (2009), highlights the necessary steps to thematic analysis in a qualitative study is to; 1) get familiar with the data by

transcribing verbatim, reading and re-reading the transcription, while making notes and identifying recurring themes. 2) code the data by using keywords observed in the transcripts, 3) use the codes to develop categories by combining similar codes, 4) search for possible relationships by linking and relating the categories and 5) compare findings and summarise results.

5.3.3 The Interview Process

As mentioned above, the respondents were sent an initial email with a participant information sheet, which contained the interview schedule as well as a consent form in line with the regulation of the host university. Further contact was made to schedule the interview and inquire about any additional questions or concerns from the respondents. At the start of the interview, the researcher ensured the consent forms had been signed and assured the participants of their confidentiality and their rights to withdraw from the study at any point. Subsequently, the research aims and objectives were described to the participants, permission to record the interview was granted, and verbal consent was obtained. The interviews were conducted in quiet meeting rooms to avoid distractions, the interview schedule served as a guide to a discussion and did not necessarily follow a serial order; instead, interaction flowed logically. As observed in Table 5:2, the interview duration was an average of 01:06:24; this allowed the opportunity to explore the construct comprehensively.

Participants	Interview Duration	Form of Interview
Res_01	00:51:37	Face-to-face
Res_02	01:20:18	Face-to-face
Res_03	00:46:42	Face-to-face
Res_04	00:54:04	Face-to-face
Res_05	01:30:11	Face-to-face
Res_06	01:15:31	Face-to-face. Additional written clarification provided by email.

Table 5:2: Interview Duration

5.3.4 Qualitative Findings

This section reports the findings of the qualitative study. It would present the outcome of the semi-structured interview and where appropriate use of direct quotes from the respondents to allow comprehensive narration of how the participants perceive coopetition and its applicability. As discussed, the meaning of the phenomena was constructed socially based on a case-by-case interaction, as in some cases, the sense of some constructs was unique to each participant. For example, the question about the form of inter-organisational interactions was perceived differently by the respondents. While some respondents described the interactions with their end-users, others viewed it as the interactions with their suppliers. e.g.

"... because at the end of the day, providing supply chain solutions for other companies is the summary of my job role; so a company's lack of supply chain expertise is good for my business". (Res_06)

"So, we need to constantly make sure that the correct materials are delivered on time to avoid any disruptions because a single mistake can cost us thousands". (Res_01)

"The primary problem is our software focuses more on trying to stand out than functionality, and we cannot always travel to provide on-ground training, so we partnered with a local firm that provides training for our clients on how to use and troubleshoot the software package". (Res_05).

The researcher is able to make more meaning about some of the themes based on a case-by-case review and then try to link these meaning to create a holistic understanding of the construct. Additionally, from the example above, semi-interviews proved helpful as the researcher was able to probe further to understand and realise more levels of IO dynamics that exist in respondents' organisations.

5.3.4.1 *Awareness of Coopetition and Extent of Practice within the Industry*

The qualitative phase of this study set out to test the awareness of coopetition in the OGI. Hence, the study checked the respondents' familiarity with the term and then investigated their knowledge about the dynamics of coopetition. The exploration study found that the respondents were conversant with the idea and notion of competitors working together, but they were unaware of the term *coopetition*, with only Res_03 and Res_05, having previous encounters with the word. In fact, Res_03 confirmed personal interest in understanding the dynamics of coopetition to make it a more applicable strategy in the industry. Many of the respondents were surprised to find that such a word exists, *"I honestly thought that was a typo, and you meant to*

type cooperation" (Res_04). As mentioned in chapter one, the industry now highly encourages collaboration among the operators in the sector, with incentives being offered to organisations willing to collaborate (Wood, 2014; Oil and Gas UK, 2019). Thus, it was no surprise to find that collaboration among competitors is a strategy already being adopted in the industry. Although, its application had been limited to creating industry standards with a few proactive organisations working with the government to develop newer, more innovative tools and instruments to improve the standard of operations.

"...so, you find after ordering a single part from one supplier and an extension from another supplier and find that one part is bigger than the other, and there is this whole activity of trying to get parts that actually fit. Then they thought, why don't we all just make sure the parts complement each other and have suppliers be up-front with their specifications"

(Res_06)

The respondents had similar answers about the first time they had experienced coopetition in the industry, and the extent of its application was limited to standardising processes to ease the operations in the industry. Interestingly, this dynamic of coopetition is now being adopted by automobile industries, particularly the makers of electric cars. Following several criticisms, about standardising of the charging facilities in the industry, it was announced that plans for standardisation are in the works being led by Tesla one of the leaders in the electric car industry (Lee and Clark, 2018). This dynamic of coopetition confirms many studies, showing that the strategy can increase network-based innovations and thus improve the industry standards of operations (Czakon, 2018; Rusko, 2014).

An interesting finding from this exploratory study answers research question 1, about the extent to which coopetition occurs unintentionally, where the parties are not aware they are in a coopetitive relationships. The study found two pieces of evidence of this form of coopetition, where the respondents assumed they were engaged in pure collaboration, but the nature of the relationships shows direct coopetition. What was thought-provoking about the realisation is that one of the respondents (Res_05), seemed to understand the dynamics of coopetition, yet remained unaware of the strategy was being utilised. The realisation occurred after further probing about the nature of their IO interactions with their partners in another region, providing on-ground training to their clients. It was observed that their partner provides alternative more affordable solutions to other smaller-scale local clientele. However, because of the level of dependence asymmetric, financial strength and brand reputation, Res_05's organisation was

able to mitigate the risk of opportunism. Notwithstanding, the threat of involuntary information leakage was present as their partner, had the opportunity to learn about their services and adopt these lessons to improve the quality of their products.

There is a higher risk of unintentional knowledge leakage in coopetition when the alliance occurs in close proximity to the consumers (Lindström and Polsa, 2016). Coopetition studies has found that one of the primary tensions in the partnership is related to knowledge management, particularly, when attempting to strike a balance between sharing information that can create mutual benefits for the parties and information that is critical to maintaining the competitive advantage (Gast et al., 2015; Kylanen and Mariani 2012). Therefore, control mechanisms need to be in place to mitigate the tensions, and the knowledge sharing in the alliance should be meticulously managed (Gast et al., 2019; Gast et al., 2015). As expected, Ghobadi and D'Ambra (2011) stressed that the dynamics of information sharing in pure collaboration is different from coopetition. Even though, Hassandoust and Kazerouni (2011), showed that organisations are more inclined to maintain a strong internal boundary, regarding knowledge sharing and may only engage in arm's length association, irrespective of the nature of IOR they are involved in, the risk of opportunism is higher in coopetition relationships. Therefore, unawareness of coopetition puts organisations at risk, especially with regards to unintentional knowledge leakage, which may affect the success of the alliance.

The other coopetition that was noticed from the exploration occurred between Res_06 and a close alliance. The nature of the relationship stresses the importance of experiential learning in the partner selection process. Although the respondent described the relationship as a purely collaborative endeavour, their partners are also competitors. The alliance was to share financial and technological capability to execute projects larger than both party's individual competence since both parties had several years of seamless relationships, the coalition formed easily. This dynamic of coopetition formation is in line with Wolffe (2016), stance on partner selection in coopetition relationship, stressing that experiential learning, reputation and cultural compatibility should be prioritised when selecting partners.

Regarding the applicability of coopetition in the UK OGI, all respondents seemed positive about its feasibility of practice except Res_02 who expressed concerns about the nature of alliance adding that

"...sure, I would collaborate with competitors if it is absolutely necessary. But it seems like a very difficult situation to put one's self in, no matter how mature the market or organisation is, why would you want to put your company at risk?" (Res_02).

This sentiment is not unusual, as scholars have even described collaboration among competitors as mixing oil with water, citing the inherent tensions as a rationale for avoiding coopetition (Dagnino and Mina, 2011). However, authors have stressed the need to balance the collaboration and competition elements of coopetition for it to be successful (Bengtsson and Kock, 2000; Kylanen and Mariani, 2012). This balance also involves the internal and external boundaries, with organisations attaining internal stability before venturing into externally supportive boundaries, which ensures the organisations are mature enough to manage the complex endeavour (Smith and Lewis, 2011; Hayes and Wheelwright 1985; Quinn, 1977).

According to Bengtsson et al., (2010), several points exist on the spectrum between pure collaboration and pure competition, including collaboration-based coopetition and competition-based coopetition based on the degree of interactions between the elements. Seeing that the OGI is characterised by intense rivalry (Oil and Gas, UK, 2016), competition-based coopetition would have been expected; however, the exploration study found that the industry is more inclined towards collaboration-based coopetition. This inclination may be as a result of the government's involvement in encouraging industry-wide collaboration, as a remedy to the downturn in the performance of the sector (Wood, 2014; Oil and Gas, UK, 2018). Interestingly, the respondents seemed to have differing views about the government enforcing collaboration. While most of the respondents agree that collaboration is beneficial for the industry as it helps address issues such as duplication and waste elimination, some believe that it can lead to forced mergers and acquisition. *"collaboration is great, but one needs to be extremely cautious, so your company does not get absorbed"* (Res_01). The risk of absorption is present in most IORs; thus, one needs to be meticulous when selecting partners. Nevertheless, the OGI seems to be capable of driving successful coopetition, especially considering the current collaborative mindset, which can increase productivity in the industry (Mariani. 2007).

Notwithstanding, the industry seems somewhat hesitant to adopt this strategy, citing the intensity of the rivalry that exists in the industry as the primary drawback. The general view about the hesitation in adopting the coopetition strategy in the industry is that the OGI is highly regulated, competitive, traditional and conservative to implement an unconventional and

drastic practice. Res_01 and Res_05, share similar views about why the practice of coopetition is not widespread in the industry, they suggest that the OGI is highly competitive, and operators are more interested in optimising returns on investments, making OGC more drawn to pure collaboration, rather than sharing *'first place'* (Res_05) with other organisations. This view shows that the coopetition concept is not understood in the industry, as successful coopetition can ensure the optimisation of investments. According to Bengtsson and Kock (2000), when individual companies pool their resources to attain a mutual goal, they can reduce individual costs and risks while achieving similar or higher advantages without coopetition. Similarly, Bouncken and Kraus (2013), notes that coopetition improves innovation as organisations can leverage on the capabilities and resources of similar organisations to create value, which can be applied to optimising infrastructures.

(Res_02) adds that the primary barrier regarding the application of coopetition is legal issues. (Res_02), stresses that because the industry is highly regulated, firms are wary of interactions with other organisations and would rather pay attention to their individual operations, ensuring they retain their competitive advantage than engage in collaborative efforts so that '*everyone has their destinies in their hands'*.

Similarly, Res_03, adds that a highly competitive mindset is one of the characteristics of the OGI, and no organisation would be interested in engaging in a strategy that is yet to be proven in the industry, mainly because the companies do not see any need to engage in coopetition since they have traditional competitive working models and believe in the philosophy that "…*if it is not broken, do not fix it"*. Giovanni and Giovanna (2002), argues that coopetition is a new mind-set and to ensure the success of a coopetitive endeavour, organisations need to cultivate a 'coopetitive mindset'. To develop a coopetitive mindset, organisations require experiential learning; however, the lack of examples within the industry makes the application of coopetition difficult within the industry. Nonetheless, practical examples can be sought from other successful coopetition in different sectors such as the aviation, ICT and automobile industries.

In contrast to (Res_03)'s view, the current model in the oil and gas industry is in fact "*broken"* and requires fixing, with evidence in the drop in the price of crude oil and the increase in the cost of production (Oil and Gas UK, 2018). With the current realities of the oil and gas industry, it is illogical and unproductive to maintain the current model, and operators need to move towards a more collaborative framework, to ensure the production is optimised (Wood, 2014).

The respondents agreed that for coopetition to be adopted in the industry, the regulatory bodies need to encourage this interaction by educating the oil and gas companies of the benefits of the relationships and provide incentives for organisations to engage in the interaction.

Despite the views above regarding the hesitation of the operators to coopetition, and the industry being a traditional one and sticking to what has always worked (Res_01), the exploratory study found evidence of coopetition in the industry. It was observed that some competitors deliberately engaged in collaboration with each other to create industry standards, with examples like First Point Assessment (FPAL), a database for the industry, which allows organisations list their capabilities transparently as well as Joint Industry Projects (JIP) which encourages network-level innovation, with organisations pooling resources for industry-wide developments.

FPAL is an industry approved supply chain database, used to link buyers with potential suppliers. The buyers benefit from FPAL as it quickens their supply chain process, as they can skip the search and verification of qualified suppliers of a product or service. The FPAL database helps identify new suppliers to enhance competition and transparency; it also ensures that all suppliers on their database are audited to industry standards, which makes the supplier selection process easier for the buying organisation. The benefits FPAL provides to the suppliers are: it enables them to identify new customers, provides performance feedback to allow the suppliers to improve on their product or service offering and compare these performances with other close competitors, so the suppliers are aware of their competitive positioning. It also saves the suppliers time by reducing individual competitive requests for information (Valmar Group, 2019).

Even though FPAL is a solution for supplier selection and risk management, there is evidence of coopetition practices, especially among the suppliers. The suppliers pooling together and listing their capabilities, comparing competitive performance to help improve their competitive advantage can be considered as the collaborative element of coopetition. While having to compete for the attention of the same customers can be considered as the competitive phase coopetition.

FPAL can be compared to the Amazon marketplace coopetitive model, where competitors can share the same platform to reach a similar customer base, which was known as the 'single-store' strategy. Suppliers could then compete for the attention of the customers through product-differentiation, price or quality Ritala et al., (2014). This strategy increased the

performance of Amazon by 28% in the first five years of adopting the coopetition business model (Ritala, 2014 p. 243). Even though FPAL is a database, it allows the suppliers present their products on a single platform and then compete on price, quality, product differentiation for a larger share of the market, which is in line with the coopetition strategy.

Another evidence of coopetition in the OGI is through Joint Industry Projects (JIP). JIP provides the opportunity for operators in the industry to pool resources, particularly, funds to create industry solutions, set standards and recommended practices that add value by solving industry challenges (DNV.GL, 2019). An example of a JIP is seen in the alliance between ten OGCs – BP, Total, Sonangol, Eni, Shell, Woodside, Engie, Saudi Aramco, Chevron and Statoil to create standardisation of equipment specifications for procurement (IOGP, 2016). In fact, while providing a rationale for this alliance, one of the partners adds that

> *"the industry continues to erode value by creating bespoke components in each of our projects and in doing so, misses the opportunity to leverage industry-level standardisation. The vision for this JIP is to standardise the specification for procurement of bulk materials, packages, modules and potential projects. This will allow for a 'win-win' outcome for operators, engineering contractors and suppliers through improved cost, schedule, quality, safety and reliability."* (Ian Cummins, Chair of the JIP)

The interesting thing to note about this JIP is that the companies involved, primarily collaborate. They pool financial resources as well as offer some level of capabilities to a third-party organisation which then conducts R&D to create innovative solutions to an industry challenge. These solutions are then confidentially distributed to the partnering organisations where it is applied as required (TWI, 2019). In this form of coopetitive alliance, the tensions are reduced as there are limited interactions between the partnering organisations. Nonetheless, the two pieces of evidence of coopetition in the industry show that the OGI is open to more explicit dynamics of coopetition.

There are also examples of emergent coopetition, as discussed above. Therefore, showing that there is room for coopetition practices to improve industry performances. Although, if given a choice between coopetition and collaboration, all but one of the respondents would prefer to collaborate, proving that more work needs to be done to convince OGC about the benefits of coopetition, perhaps an industry example needs to be set.

Additionally, Res_03, adds that there is currently no catalyst to engage in coopetition, while the government offers incentives and highly recommends collaboration, there are no additional

benefits provided to organisations willing to engage in coopetition. This stance, therefore, reiterates the role of the government and other regulatory in enforcing coopetition in the oil and gas industry. The government can set industry examples by overseeing an initial coopetitive alliance; they can also educate the organisations in the industry about the benefits of coopetition. In addition, they can offer incentives, such as tax rebate to organisations willing to engage in coopetition.

5.3.4.2 *Governance and Management in Coopetition*

Coopetition is characterised by several tensions and mismanaging the relationship can lead to a failure in the alliance. As discussed in the review of literature, the two significant principles regarding the management of the tensions are separation or integration of the primary elements, with some authors encouraging the combination of both principles, or separating the elements (Bengtsson and Kock, 2000; Herzog, 2010; Pellegrin-Boucher et al., 2013; Fernandez et al., 2014). Regardless of the method of managing the different logic, it is important not to suppress any of the logic as that would affect the dynamics of the alliance, impacting on the success of the interaction (Bengtsson and Kock, 2000).

> *"... I have never been in a coopetitive relationship, but I would assume managing it would not be an easy task. (Res_02)*

> *"I don't know much about managing coopetition, but I know managing collaboration can be tasking sometimes, I imagine this would be worse" (Res_06)*

> *"If I had to guess, I would say have a strong legal team, and make sure collaboration ends before the competition begins ...but I don't know if that's possible here" (Res_05)*

The consensus from both the literature review and the qualitative interview is that managing coopetition is not an easy task. Several authors have identified different ways of managing the alliance, and what elements should remain at the fore to ensure a successful partnership. For instance, Bengtsson and Kock, (2000), support separating the contradictory aspects of coopetition to allow the individuals seamlessly navigate the alliance, pointing that integration may become too complicated for individuals. Pellegrin-Boucher et al., (2017) believes that the separation would create more tensions, particularly internally and compromise the internal stability of the organisation and suggests the concurrent management of the relationship

(integration). While Le Roy et al., (2018), recommends both integration and separation of the elements, based on the level of interaction.

From the explorative qualitative interview, all the respondents agreed with Bengtsson and Kock (2000), stating that integrating the elements would complicate the relationship further. The respondents drawing from their experiences with other forms of IORs agree that starting one aspect of the coopetition alliance after the other has ended seems like the best way to manage the relationship.

Interestingly, Res_03, suggests that all the participants in a coopetitive endeavour should have a coopetitive mindset, because when a party expects its partner to act competitively, *"...then no one can catch you by surprise".* While this view is in line with Gnyawali and Park (2011), it should be an antecedent for a coopetitive endeavour as opposed to a means of managing the relationship. Merely having a coopetitive mindset is not enough to ensure its success, it can impact on the success of the relationship, as all parties are expecting the other coopetition partners to behave underhandedly for their personal gains, which creates new tensions in the relationship (Luo et al., 2008). This issue addresses the contradiction relating to coopetition for a private benefit vs joint value creation. Although, Lado et al., (1997) encourages organisations to adjust their mindsets to a more coopetitive one, to cope with the complexities of the relationship, which can make managing the alliance easier, expecting a partner to act deviously can position a partner to behave opportunistically, thus affecting the success of the partnership. Additionally, it is farfetched to assume that everyone willing to engage in coopetition in the industry would have the same behavioural patterns or expectations, but a coopetitive mindset may mean that the parties are eager to balance the coopetition paradox.

Res_02, adds that the government can get involved in managing coopetition, by regulating the alliance and introducing industry standards which would include boundaries, concessions, sanctions, to ensure that the coopetitive endeavour is conducted efficiently and legally. Even though this view falls outside the organisational boundaries, it gains credibility from Luo (2004), that third parties' involvement in managing coopetition, helps address the issues with the integration principle, while also managing the tensions in the relationship. The government involvement in managing the coopetitive alliance may prove beneficial for the industry as it can encourage more collaborative efforts in the sector even among competitors, which would improve industry performance. Government involvement would address the risk of illegal anti-competition arrangements that coopetition may support. Ritala (2012), points out that while

coopetition is a useful strategy for improving performances and innovation, some organisations may adopt the strategy to control the market in a cartel-like agreement. Ritala (2012), also stresses the role of the legal structure in addressing anti-competition, stating that if the law is too strict, it can discourage coopetition, while a loose regulation can encourage deviousness. Thus, government plays a pivotal role in ensuring a successful coopetition alliance. Although, it is unrealistic to expect that the government would micro-manage every coopetitive relationship in the industry, the extent of their involvement would be creating standards and providing incentives for the coopetition. It is, therefore, vital to review how third-party managers would be selected and how to manage the tensions that this management mechanism may introduce.

Some of the participants propose that the most proactive way to manage a coopetitive relationship is by adopting an internal management mechanism, for instance, Res_05 adds that

"an independent team to manage the relationship should be formed from within the participating organisations, to handle the interactions especially conflicts and information exchange." (Res_05)

Fernandez et al. (2014), points out that introducing another party to manage a coopetitive alliance adds another form of inter-organisational tensions. This new tension arises as the actors in the alliance need to manage the actions of the third-party management team. However, literature has stressed the benefits of using a dedicated alliance function to manage relationships between organisations (Kale et al., 2002; Lavie, 2016). The studies show that organisations that use dedicated alliance function to manage their IORs have a higher success rate in comparison with organisations that do not use a dedicated alliance team.

It should be noted that the use of an independent third-party organisation and dedicated alliance function refers to the management of the coopetition relationship and not the tension management, which can be separated or integrated. Thus, from the exploration, the respondents, agree that a dedicated alliance team should be created to manage the relationship, as using a third-party organisation may introduce more risk to the organisation.

"…there are several consulting companies that promise you everything, but only you know and those you work with understand the risks involved, so I would rather select a team from within my organisation and my partner's organisation to manage the relationship" (Res_06).

The qualitative study provides a more practical way of managing coopetition, which is different from what the literature offers regarding separation or integration (Bengtsson and Kock, 2000; Ritala et al., 2009; Ritala 2012; Pellegrin-Boucher et al., 2013; Fernandez et al., 2014). The participants recognise that the management of the relationship should be separated from the implementation, to address the tensions and encourage a seamless coopetition arrangement. Nonetheless, managing coopetition should involve striking a balance between the significant elements to achieve a beneficial alliance. Thus, the strategic issue is not to choose between one dimension of the relationship, but to effectively manage the inherent tensions (Chen, 2008). Reducing these tensions may suppress the competitive aspect of the relationship, which may affect the nature of the interaction, as competition plays an essential role in coopetition (Bengtsson and Sölvell, 2004). The exploration showed that government or industry regulations could provide useful guidelines and rules about the tension management of tensions in the industry, which is called co-management (Fernandez et., 2014). Notably, all the respondents agreed that the ability to manage tensions effectively in an IOR would positively influence the outcome of the alliance.

The most significant concern in adopting the coopetition strategy is the threat of opportunism (Zeldin, 2004). Collaborating with partners with similar consumer base can put an organisation's competitive advantage at risk if not properly managed. One of the contradictions in the coopetition paradox is value creation and value appropriation (Bradenburger and Nalebuff, 1996), brings the issue of opportunism to the forefront, as partners strive to obtain the most substantial chunk of the created value, and may resort to treacherous acts to get this value. Additionally, because the motives of partners to engage in coopetition, may not be apparent, organisations may enter a coopetitive relationship to learn about the operations of the other partners to gain competitive advantage. Opportunistic behaviours in the coopetitive alliance can upset the collaborative elements in the interactions, which jeopardises the entire relationship, and shifting the exchange from a win-win strategy to a win-lose or even lose-lose strategy (Res_01; Bengtsson et al., 2010).

Opportunism in coopetition can manifest in several ways, including knowledge and information sharing, role execution, the balance between power and dependence (Gnyawali and Park, 2011). These opportunistic behaviours can introduce additional tensions in a relationship and result in loss of competitive advantage, market and information, which can result in hostility and lead to instability in the relationship. Therefore, undermining the benefits that can be achieved through coopetition.

Consequently, partner selection in coopetition is an essential task that should be undertaken with careful consideration, ensuring there is a balance between the power and dependency dominance, as well as the need for collaboration and competition, to reduce the risk of opportunism (Luo et al., 2008). In addition, the relationship should be effectively managed and governed to control the interactions to help mitigate the risks associated with the complicated alliance. According to (Zineldin, 2004), trust, commitment and assurance of mutual benefits are pre-conditions for a successful partnership. When there is trust, it becomes unnecessary to specify every detail regarding the relationship.

Several authors have highlighted the importance of trust in IORs (Zineldin, 2004; Chin et al., 2008; Osarenkhoe, 2010). Some of the respondents also agree with the authors about the role of trust in coopetition

"lack of trust can be potentially disadvantageous in this form of relationship" Res_01

"... based on the reputation and the capability of the organisations in the past, you trust that would act in the benefit of the relationship" Res_06

"Trust is good, but you cannot just trust blindly, they need to earn your trust, then you can let your guard down" Res_04

According to Zindeln (2004), the ideal coopetition alliance would exist between partners in a trusting and committed relationship, characterised by individual willingness, motivation, strategic fit, integration and integrity with asymmetrical power and dependency dynamics. *"Trust comes from, commitment, it is difficult to trust a non-committed partner"* Res_06. This view is seconded by Luo (2004), who agrees that commitment in a relationship develops from the knowledge that a partner is reliable, competent and trustworthy, possessing qualities, such as consistency, responsibility, proficiency, honesty and resourcefulness. As such, these characteristics should be sort in potential coopetition partners to ensure a sustainable relationship. Luo (2004) also identified that distrust in an alliance could stem from behavioural patterns, previous negative experiences as well as the difference in partners perception towards the competition and cooperation dualities of coopetition (Luo, 2004).

However, some of the respondents had an opposing view on the issue of trust in coopetition.

"it's business. You don't trust in business" Res_02

"it doesn't make sense to me to trust your competition" Res_04

"I would be careful with sharing what gives me an edge in the market" Res_06

"...I can trust, but more than that, I would make sure I have a strong legal backing to protect me in case anything goes wrong" Res_05

Contrary to what the literature states, some of the respondents are sceptical about the role of trust in coopetition. Even though some of them do not doubt the importance and effectiveness of a trusting relationship, they still believe that trust alone is not enough to protect a business against opportunistic partners. They suggest that more efforts need to be in place to protect the competitive advantage of the company, retain their customer base and avoid opportunism. Additional emphasis was made regarding the nature of the OGI, and the need for legal coverage in every form of alliance, to prevent problems that can arise from interactions with other organisations.

When asked what type of governance is most suited for a coopetitive relationship, most of the respondents agreed that a contractual agreement was more reliable and appropriate than trust. With the view that a coopetitive relationship can be successful without a trust relationship, but without contractual backing, the relationship is doomed to fail. Although (Res_06)'s stance was in line with the literature, adding that, while contractual agreements are essential to get a relationship running smoothly, trust is vital to start the relationship *"you would never get in business with someone that has a bad reputation and you do not trust"*.

Several studies, concerning what makes coopetition successful, argue that relational governance, mainly, trust is a critical coopetition success factor (Chin et al., 2008; Ceptureanu et al., 2018; de Resende et al., 2018; Cygler et al., 2018). They stress the importance of trust and trust development, even at the initiation of the alliance, to ensure a seamless relationship. Some studies also place the need for trust in coopetition above the need for contractual agreements (Bradach and Eccles, 1989). Contrary to the literature, the exploratory study shows that while the respondents value the role of trust in IOR, they suggest that trust is not a critical success factor and that contractual agreements can protect them in the relationship. In fact, they indicate that contractual agreements aid trust in an IOR and should be prioritised. This stance could be as a result of the OGI being a highly regulated industry and organisations need to regularly protect themselves from any legal issues which may arise as a result of engaging in coopetition or other forms of IO alliances.

Therefore, it is implied that while both relational and transactional governance is instrumental in ensuring a successful coopetitive relationship, transactional governance, i.e. contractual agreements play a more pivotal role than relational governance.

5.3.4.3 *Coopetition and Supply Chain Capabilities*

A flexible supply chain is one that is both able to avoid and recover quickly from any disruption (Stevenson and Spring, 2007). SCF is concerned primarily with the speed in which a SC can respond to changing demand in the business environment to either maintain or increase competitive advantage. Customers, as well as potential collaborative partners, are more attracted to organisations with a flexible supply chain and capable of delivering value. Thus, it becomes crucial to investigate how SCF can increase coopetition performance. The qualitative study first investigated how coopetition may affect the flexibility of the organisation and then tried to understand the effects of SCF on coopetition.

The qualitative interviews found that if coopetition is carried out successfully, it would have a positive impact on supply chain flexibility. They suggest that coopetition can improve the performance of a supply chain, especially with regards to the speed of response. Since a SC comprises of more than one organisation, several organisations pooling their resources through coopetition to overcome disruptions increases the flexibility of a SC. For instance, Res_01 adds that

"... having a collaborative partner when we need something urgently, speeds up the process. So, we don't have to run new tenders, evaluate the prospective partners and then award the contracts. We can skip that process and go straight to business". (Res_01).

This suggests that coopetition can allow a supply chain to become more efficient as wastes are eliminated. For instance, from the example above, wastes associated with lead time can be eradicated. (Res_03) agrees with this assessment, adding that *"coopetition can remove waste, duplication, long lead time and wasted efforts."* Similarly, coopetition impacts supply chain by allowing a more flexible supply chain, which implies that the SC is capable of responding quickly to the changes relating to demand or supply and handles disruptions effectively (CIPS, 2018). Res_04, in agreement, adds that

"coopetition impacts SC, as it makes it more flexible to withstand disruptions, which makes the SC faster, a fast SC reduces costs and allows us to reach the crude oil faster, which in

turn gives us a better Net Present Value and better outputs, which gives us more revenue".

(Res_04).

A flexible and quick supply chain aids in ensuring resilience; thus, with coopetition, a SC becomes more resilient. Flexibility in supply chains has been perceived as a means of combating risks, while the speed of operations, particularly in recovering from a disruption shows that the SC is reactive which supports the positive impacts of coopetition on supply chain resilience.

It should be noted that resilience in the supply chain extends beyond risk management, but also involves building a flexible and smart SC, that allows organisations to become reactive and proactive to keep up with the changes in both demand and supply.

The literature agrees that coopetition has a positive impact on organisational performance (Robert et al., 2018) and on improving supply chain capabilities (Kovacs and Spens, 2013). The respondents also share this view in the qualitative study. Most of the respondents attributed the improved performance in the supply chain to costs.

"...through coopetition, the overhead costs are reduced, and the savings can be transferred to other profitable investments, that would benefit the company." (Res_01)

"I suppose, coopetition can help ensure that services are delivered to clients in a timely fashion and at a lower cost" (Res_06)

"...you can share resources, such as warehouses, which saves you significant amounts of money" (Res_03)

Interestingly, this view is in line with (Wood, 2014), suggesting that collaboration be encouraged among operators in the industry to optimise efficiency. There are several ways to ensure optimisation of the SC through coopetition. For instance, drawing from respondents, coopetition allows resource sharing. Resources such as transportation, vessel and platforms, pipelines, storage facilities, boats, heavy-duty machinery can be shared among the operators, which can reduce the overhead costs and create an avenue for additional savings, which in turn can ensure a more efficient SC.

It should be noted, however, that these arrangements require proper planning to avoid tensions and conflicts in the alliance. Res_05 notes that disputes can quickly arise in this form of partnership, adding that

"If we are sharing a helicopter, for instance, I want my people to be moved first before any other platform is serviced, and I am sure that's how other companies are thinking".

Similarly, Res_01, suggests that to avoid conflicts and ensure that value is achieved from the coopetitive endeavour, effective communication in the alliance is vital. Chen (2008), adds that one of the necessary conditions for successful coopetition is effective communications and communication management. Thus, to harness the benefits of coopetition, specific measures need to be in place, and the alliance needs to be effectively managed.

Furthermore, similar to (Res_01), (Res_06) adds that coopetition can positively impact on the supply chain performance in the industry through competitor sourcing.

"so, if a competitor has a material I desperately require, I can source it from them. This saves time, as I don't have to source for alternatives." (Res_06)

This view draws from the dynamic of coopetition, which involves sourcing from competitors. A notable example of this form of coopetition is the alliance between Samsung and Apple. Samsung and Apple have been described as the industry giants in the smartphone manufacturing industry, but still engage in coopetition, with Apple sourcing majority of the components for its iPhone, from Samsung, despite competing for a larger market share in the smartphone industry (Kwok and Lee, 2015). A study by Vergara (2012 p. 78), points that the advantage of this form of arrangements is that both Samsung and Apple can 1) protect their market position, 2) break into new and related markets, and 3) improve their capabilities. Vegara (2012), stressed that this alliance was advantageous to Apple, as it allowed the company focus on its core capability of designing elegant and cutting-edge technologies which allowed them to diversify from solely the PC market to enter the smartphone industry. Additionally, Samsung benefit from the alliance, was its ability to achieve economies of scale, which allows them to maintain their position in the market as a consumer electronics giant, through leveraging on its ability to produce and assemble components on a large scale.

This shows that there are significant advantages to be attained when some components are sourced from competitors. Res_06, suggests that it saves time as searching or alternative sources, vetting the source for quality may be time-consuming, speeding up the process allows the operators more time to focus on their critical capabilities, like in the case of Apple, therefore making the supply chain process more efficient.

Another avenue for supply chain optimisation through coopetition is the decrease in the cost of inventory. (Res_03) Observed that there is a considerable cost associated with inventory in the industry, as the industry requires an enormous volume of materials, which would add to the cost of inventory. Competitors sharing inventory can free up costs, which can be re-invested in other value-adding activities. (Res_03) adds that coopetition, in inventory activities can decrease the amount of time between ordering periods, thus improving the efficiency of the supply chain. Additionally, the risk of theft, damage or equipment becoming obsolete is reduced, as the quantity of inventory decreases.

The findings from the exploratory study show that coopetition is a useful supply chain strategy as it positively impacts on supply chain resilience, improves supply chain capabilities, increases flexibility within the supply chain. It also creates opportunities to improve supply chain efficiency by reducing the costs and optimising supply chain processes. However, to increase the adoption of this strategy, the government and other regulatory agencies in the industry need to educate the operators about the benefits of the strategy and also provide measures to aid in managing the tensions in the relationship.

On the flip side, respondents were asked what value, the flexibility of the SC can offer the performance of coopetition. All the respondents agreed that flexibility could be advantageous to the outcome of coopetition.

"When there's flexibility, there are several suppliers involved the SC which would make partner selection easier" (Res_01)

"...organisations can insist on collaboration among their suppliers, so during coopetition with other companies, the lessons learned can be adopted." (Res_03)

"The more flexible a SC is, the easier it is to deal with the risks of coopetition" (Res_06)

One of the critical areas that the respondents agree would be of value is regarding partner selection in coopetition. They stress that organisations with a flexible supply chain value agility of the SC process and as such, can respond effectively to any disruption in their SC. One of the drivers of this SC principle is the pool of suppliers, including suppliers that may be complementary or competitors. Thus, the flexibility of the SC eases the partner selection process. Additionally, organisations with flexible SC *"would possess the ability to identify value-adding partners"* (Res_02), which can speed up the operation of the alliance as well as improve the performance of the relationship. Another area that was identified is regarding risks.

The respondents gather that since flexibility involves reacting effectively to disruptions, then the organisations in coopetition would manage the risks in the relationship more effectively. (Res_06) perceives its effects from an experiential learning viewpoint, such that as organisations can influence its suppliers to collaborate, they can learn from the alliance to ensure that their coopetitive relationship is successful. In addition to this, Cygler (2018), found that the flexibility of an organisation's SC contributes to the longevity of the coopetition alliance.

Since there are limited prior studies in this study area, the responses of the participants regarding the effects of SCF on coopetition performance would be considered for the hypothesis and the conceptual framework.

5.3.4.4 *Summary of Qualitative Study*

This section presents the outcome of the qualitative study, conducted to investigate the perception of coopetition in the UK Oil and Gas Industry. The study was conducted through a semi-structured interview of experts in the OGI, using purposive sampling, based on the amount of experience of the individuals in the industry and exposure to inter-organisational relationships.

Expectedly, the study finds that the concept of coopetition was intriguing to the respondents, which is a similar reaction among scholars. Some authors focus on the dangers of coopetition, such as the tendency to encourage anti-competition and cartel-like behaviours among market giants and the tensions in the arrangement to discourage the strategy (Ritala and Hurmelinna-Laukkanen, 2009). In contrast, other authors argue that coopetition increases competition capabilities as the need to outperform their rivals after the collaborative phase increases (Frédéric and Famara 2014). Additionally, several authors stress that some values and benefits can only be derived from this form of alliance, like; increased innovativeness, as organisations catering to the same market, understands the needs of the market more than other non-competing organisations (McCarthy et al., 2018).

The study finds that while most of the respondents were unfamiliar with the term, coopetition, they were aware of previous occurrences of the strategy in the industry. It was observed that some form of coopetition has been in practice in the OGI, mostly to standardise and ease operations in the industry, for example through FPAL and JIP. The study also found that there is some level of unintentional emergent coopetition, with evidence from Res_05 and Res_06.

This unintentional coopetition proves that because of the intense rivalry in the industry, some collaborative efforts practised within the industry may be coopetition, which may be the reason for the limited successful collaboration. When engaging in coopetition, the partners need to be aware to ensure that their businesses are protected from opportunism, and the tensions can be effectively managed.

Another finding from the study, both secondary and qualitative, shows that the tensions in coopetitive alliances hinder organisations from engaging in the strategy, as businesses are careful not to endanger their competitive edge. Issues relating to opportunism, uncertainties, legal concerns causes tensions and conflicts in coopetition and are significant drawbacks in the application of the strategy (Res_01; Res_03; Res_05; Gnywali and Park, 2011; Zineldin, 2004). Despite the tensions, several benefits can be attained from the alliance. As such, parties involved in coopetition should ensure that the decision to enter such alliance is carefully made and the relationship should be effectively managed to reduce the risks in the interactions.

Even though there seems to be no consensus, both among the respondents and authors regarding the management of coopetition, they all agree that managing coopetition is a complicated task. While scholars are yet to decide between the separation, integration or combined principle of managing coopetition (Bengtsson and Kock, 2000; Herzog, 2010; Pellegrin-Boucher et al., 2013; Fernandez et al., 2014), the respondents in the study agree that the coopetition elements should be separated to ease the tensions in the relationship.

In addition, the respondents suggested other forms of managing the relationship. For instance, Res_03 indicates that all parties in the alliance should have a coopetitive mindset to reduce any elements of surprise and tensions, Res_02, stresses the importance of government involvement in setting regulatory measures to manage the relationship, mainly because of the high level of regulation in the industry. Additionally, Res_05, suggests that a team to maintain the relationship should be formed from within the parties involved in the coopetition arrangement. Regardless of the management method, parties in coopetition should ensure that both elements of the strategy are presented and not diluted, in order not to remove the benefits of the alliance (Bengtsson and Kock, 2000).

Furthermore, the study finds that governance in coopetition is crucial. However, contrary to the literature, most of the respondents seemed more inclined to transactional governance, i.e. contractual agreements. The respondents acknowledged the role of trust in coopetition, adding that, reputation, experiential learning, commitment, builds trust in a relationship, which

reassures the organisation of the quality of the relationship, but contracts provide protection for the organisations. In fact, Res_02 explicitly suggests that competitors should not be trusted in any alliance. Additionally, the nature of the OGI, being a highly regulated industry, does not allow room for blind trust in an alliance; thus, all the respondents ranked transactional governance above relational. This finding is contrary to the literature, where Ceptureanu et al., (2018), ranked trust has the most critical coopetition success factor within the oil and gas industry.

Another finding from the qualitative data shows that coopetition can significantly improve the SC flexibility and capability of an organisation. Sharing common resources such as warehouses, transportation, pipeline, equipment and machinery, among competitors can free up both costs and time, which can be reinvested into activities that increase productivity and performance. Also, reducing the number of wastes caused by duplication can ensure a more resilient SC. For example, FPAL offers buying organisations several options of verified suppliers, which reduces the time needed in sourcing qualified suppliers for a project, thereby improving resilience as the organisation can recover quickly from disruption.

Organisations can take advantage of the reduced costs and time created through coopetition to enhance the flexibility and speed of their SC activities to create additional value for their businesses, thus increasing SC resilience, since speed and time are critical in ensuring a resilient supply chain (Chopra and Sodhi, 2014). Coopetition is also beneficial in providing solutions to industry challenges, as organisations can pool resources to investigate innovative ways to address their critical needs, which can improve industry performance.

In the same vein, the respondents agree that the flexibility of the supply chain can improve the performance of coopetition, as it allows a more straightforward partner selection process, which is a critical aspect of coopetition success, identified under the relationship development level of Chen et al., (2008), hierarchy. The exploration also found that flexibility can improve an organisations capability of coping and mitigating the risks in the alliance, which can also influence success in the alliance.

Despite the benefits, the respondents had some reservations about the application of the strategy in the industry. For instance, Res_05 points out that the rivalry in the industry is a hindrance as no organisation in the industry would want to be served second. Other issues such as the fear of opportunism, the tensions in the alliance, lack of coopetition experience, the

limited catalyst for coopetition, the conservative and traditional nature of the industry explains the hesitation of OGCs to adopting the strategy.

The findings from the exploratory study are critical not just to this study but also to the UK government and OG regulatory agencies in the country, as it shows the perception of OGCs to coopetition. The research indicates that while the organisations are open to adopting the strategy for the several benefits it provides, there is a fear of breaching any of the industry rules which can create legal concerns for the companies and perhaps result in the loss of business. Therefore, the regulatory agencies need to provide a conducive environment for coopetition to occur, ensuring a balance between being strict (discouraging the parties) and being too loose (encouraging dishonest behaviours).

Additionally, while the exploratory study, helped provide answers to some of the research questions, it also uncovered some additional areas to be investigated. For instance, there seems to be a disjuncture between some of the findings in the study and literature, particularly regarding governance in the alliance. Several studies argue that relational governance such as trust is crucial for a successful coopetition alliance, the exploratory study finds that pure reliance on relational governance can be detrimental to the alliance, stressing that competitors should not be trusted, and organisations need to ensure their businesses are protected by adopting transactional governance.

The findings from this study would be adopted in two folds:

1. The results would be compared with the literature review to design the conceptual model. The findings would also be instrumental in defining the hypothesis for further investigation into the dynamics of coopetition in a follow-up quantitative study.

2. The outcome of the qualitative study is influential in designing the quantitative instruments (i.e. questionnaires). Since there is no state-of-the-art coopetition review in the Oil and Gas Industry, some aspect of the qualitative study would inform some of the questionnaire questions, especially where measurement scales are missing or not relevant in literature.

5.4 CONCEPTUAL DEVELOPMENT AND HYPOTHESIS DESIGN

Following the exploratory phase of this study presented above, some insights regarding the crucial elements of coopetition were uncovered, particularly relating to the governance and management structure that can be utilised to ensure successful coopetition. The results of the exploratory study and the outcome of the literature review would be combined to develop a conceptual framework for this study. This section would also develop and discuss the hypothesis, which is essential to answering the research questions for the study.

Theoretical Background of Coopetition

As observed in the review of literature, coopetition is usually underpinned in three main theoretical concepts: game theory, resource-based view and transaction cost theory. Game theory threats the coopetitive relationship as a positive-sum game, where all partners have the opportunity to benefit from an alliance (Brandenburger and Nalebuff, 1996). The concept of coopetition was presented as a game, where the parties involved have an overlapping interest, based on the prisoner's dilemma game (Brandenburger and Nalebuff, 1996). According to Axelrod (1994), the principle of reciprocity was applied in the prisoner's dilemma to reduce the opportunistic tendencies of the players. This principle encouraged the players to be strategic in their actions. Okura (2007), lists three advantages of using game theory to analyse coopetition. Okura (2007), mentions that game theory can contain some strategic interactions among organisations in direct competition. The profits an industry realises is not only linked to the decisions made by an organisation but the decisions of every essential play in the industry. Additionally, game theory is also helpful in coopetition studies as it can be used to represent a complicated situation with a simple model. The game theory supports the analysis of complex situations, by systematically differentiating the collaborative and competitive elements which may be otherwise be intertwined in real-life experiences. Finally, game theory provides a precise analytical method. According to Okura (2007), coopetition can be represented in game theory as an extensive-form game which contains the collaborative (positive-sum) and competitive (zero-sum) phases. Hence, coopetition can be perceived as a variable-positive-sum game.

Additionally, Parkhe (1993) observed that the number of players, the activity timeframe and the pay-out structures influence the nature of the activities in the alliance. Similarly, it was noted that players were more inclined to cooperate in instances relating to futuristic goals

(Axelrod, 1994). In line with game theory, Brandenburger and Nalebuff (1996) developed the value net model and the PARTS (players, added value, rules, tactics and scope) model of coopetition. It was found that value could be added to an organisation, both vertically and horizontally. Hence, the competition aspect becomes necessary to share the value that has been created among the coopetition members.

Another theoretical perspective of coopetition is the transaction cost theory, which posits three forms of organisational functionality, namely; market transaction, hierarchical structures, and hybrid relationships (Williamson, 1987). The coopetition concept is positioned within the hybrid relationship, and it has been argued that organisations engage in hybrid relationships as a means of reacting to market instability and hierarchical structures by creating additional transaction costs (Williamson, 1987; Park and Russo, 1996; Madhok, 2000). The hybrid nature of coopetition causes tensions in the alliance as a result of the competitive element of the collaboration, which can increase uncertainty among the players (Chen et al., 2007). Therefore, the level of trust in the alliance based on the transactional cost theory is low, leading to opportunism in the relationship (Hill, 1990). Collaboration among rivals increases the likelihood of conflicts and tensions, which contributes to the increase in opportunism.

From RBV, competitive advantage comes from owning valuable, rare, inimitable, non-substitutable capabilities that allow the firm to offer its customers better value than competitors. Fundamentally, two assumptions underpin this approach: (a) firms are heterogeneous with respect to their resource profiles, and (b) those resources are not entirely mobile across firms (Barney, 1991). This theory stresses that organisations can collaborate with other organisations (including competitors) that have complementary and strategic resources, to create additional value, by combining their resources (Chetty and Wilson, 2003; Clarke-Hill et al., 2003). RBV evolves around the idea that the sustainability of competitive advantage strongly depends on an organisation's ability to develop capabilities for innovations. This dynamic capability-based approach emphasises skill acquisition, learning and capability accumulation which provide a convenient basis on which the accumulation of resource stock through coopetition will be examined.

Additionally, coopetition can also be formed to create resources, through the development of innovative technologies, jointly acquiring new knowledge and improving capabilities (Das and Teng, 2000).

In addition to the theoretical perspectives discussed, coopetition has been viewed from the concept of strategic alliances (Vaidya, 2011), network theory (Gnyawali et al., 2006), institutional theory (Monticelli et al., 2016) and social exchange theory (Osarenkhoe, 2008). This study is also grounded in Mintzberg and Water's (1985), emergent strategy lens, which observes that strategies can be adopted without an explicit intention — indicating that coopetition can occur as an unintended strategy.

Even though there are no explicit theories to be adopted in this study, the research draws from the above theoretical stances as well as the knowledge obtained from the exploratory analysis to underpin the concept development.

5.4.1 Designing the Conceptual Model

Creswell (2014), describes a theory as a set of interrelated constructs, that results in the development of research hypothesis, the constructs for the conceptual model (Figure 5:2) are linked to the outcome of the qualitative findings, the review of literature and theories relating to IORs (such as TCE, RBV and SET). These constructs include relational and transactional governance, dedicated alliance functions, tension management, supply chain flexibility, intentional and unintentional coopetition. These constructs have been introduced and discussed in chapter 2 and earlier in this chapter.

Although some of the relationships identified have been explained, in some theories, such as the positive influence of dedicated alliance function on the outcome of IORs, the identified constructs seek to explain the how successful coopetition can be achieved either has an unintentional or intentional strategy. The aim of the model is to relate the conceptual framework and its hypotheses to the research objectives and questions.
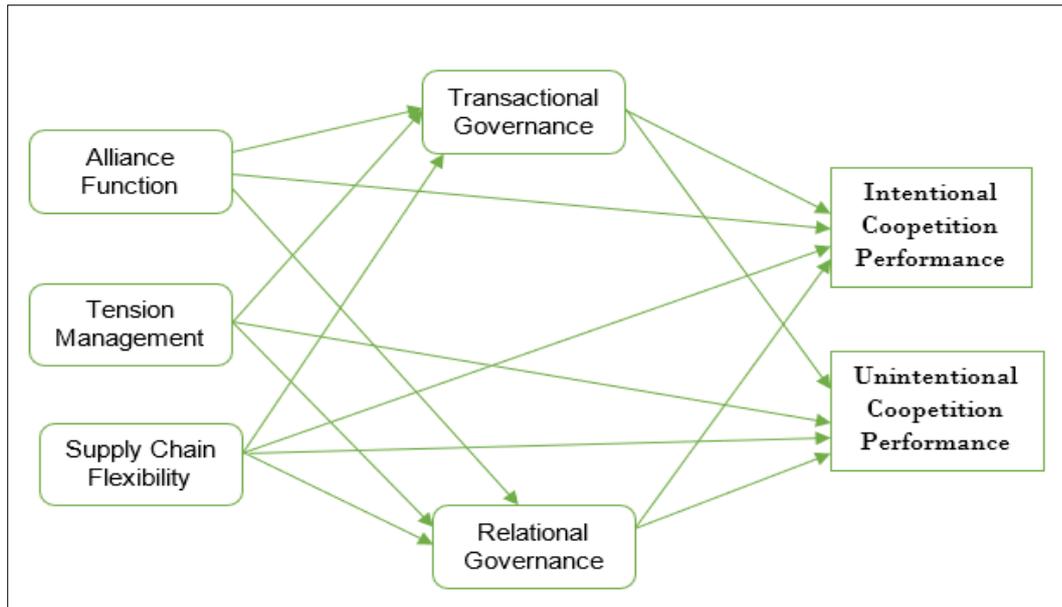
Figure 5:2: Conceptual Framework

5.4.1.1 *Transactional Governance*

According to the Transactional Cost Economics (TCE), which is one of the essential theories for calculating the risks in IORs (Williamson 1975), the extent of a partner's opportunism is unknown and cannot be wholly calculated, and the notion of trust in IOR, cannot avert the risks. This theory suggests that trusts alone cannot be utilised as a governance mechanism in a coopetitive relationship, due to the tensions which can lead to knowledge leakage and opportunism. Hence, Williamson, (1985), emphasises the need for a detailed contractual agreement, which addresses issues such as uncertainties, asset specificity and the frequency of the transaction to attain a favourable IO interaction. Additionally, Corsten and Felde, (2005), notes that regardless of the level of trust in an IOR, control measures such as contractual agreements need to be in place to ensure that every party in the relationship is made explicitly aware of their roles, expectations and the consequences of their actions. Since these stances are drawn from inter-organisational management literature as opposed to coopetition literature, it can be assumed that this stance regarding the effects of transactional governance can be applied to coopetition that occurs as an intentional and unintentional strategy.

From the qualitative study, all the respondents stressed the importance of contractual agreements in IORs. The respondents explained that because the OGI is highly regulated, organisations are concerned about acquiring any legal liability as a result of interacting with other organisations in the industry. They also explained that no organisation wants to bare or incur additional risks in its operations; there is a need for clarity regarding how the uncertainty

in the alliance would be shared. This clarity can be achieved by prioritising transactional governance in coopetition alliances. Based on the above, it can be assumed that adopting a transactional form of governance would improve the performance of a coopetitive relationship adopted as a deliberate strategy.

Similarly, due to the nature of the OGI, which is characterised by intense rivalry, and the industry encouraging its operators to engage in collaboration, it was observed that a collaborative form of coopetition exists in the industry. Also, evidence of unintentional coopetition was found from the exploratory study. Therefore, it can be assumed that the adoption of transactional governance, can limit opportunism and risks in any coopetitive relationship that occurs unintentionally. Hence, this study expects that the relationship between transactional governance and the performance of both intentional and unintentional coopetition would be positively correlated.

- *Hypothesis I(a): The effects of transactional governance on intended coopetition performance positive.*
- *Hypothesis I(b): The effects of transactional governance on unintended Coopetition Performance is positive.*

5.4.1.2 *Relational Governance*
The impacts of trust in coopetitive and inter-organisational studies have been studied extensively, in management literature. Several authors have included trusts as one of the critical coopetition success factors (Chen et al., 2008; Osarenkhoe, 2010), as well as in any form of inter-organisational alliance (Anderson et al., 1994; Cannon and Perreault, 1999). Nielsen (2011), found that trust in a relationship can reduce risks and conflicts as it allows for the creation of goodwill, which can foster commitment among partners. Creed and Miles (1996), state that an IOR without trust or with low trust levels is destined for failure, implying that no IOR can occur successfully without a high level of trust. Additionally, the concept of relational governance has been examined from the social science perspective, where it is believed that trust does not have to be unconditional or blinding and can serve an informal control mechanism to reduce the relational risks in IORs (Ring and Van de Ven, 1994; Berger and Noorderhaven, 1997). They argue that not all humans in the business environment are opportunistic and driven by self-interest, but some are honest and have the common human decency with can be enhanced in a trusting relationship, through reciprocity, personal bonding etc. From a coopetition viewpoint, Brolos, (2009), believes that relational governance can act as a social lubricant to improve the relationship among partners and help develop shared values

even if the parties are in competition with each other. This stance follows from (Das and Teng, 2001), claim that trust has a positive impact on IOR and can be substituted for formal contracts. Hence, based, the relationship between relational governance and coopetition should be positive, as these studies have emphasised its importance in achieving a beneficial IO performance.

The exploratory study found that trust is also an essential factor in attaining beneficial coopetition, even in industries as complex and competitive as the OGI. They identified the presence of trust as an incentive for partner selection, for instance *"... based on the reputation and the capability of the organisations in the past, you trust that they would act in the benefit of the relationship"* Res_06. Several studies, concerning what makes coopetition successful, argue that relational governance, mainly, trust is a critical coopetition success factor (Chin et al., 2008; Ceptureanu et al., 2018; de Resende et al., 2018; Cygler et al., 2018). They stress the importance of trust and trust development, even at the initiation of the alliance, to ensure a seamless relationship. Some studies also place the need for trust in coopetition above the need for contractual agreements (Bradach and Eccles, 1989). As a result, it can be assumed that the adoption of relational governance, can promote reciprocity and mutual respect in IORs such that coopetition partners would not act deviously towards the other parties in the relationship. Hence, this study expects that the relationship between relational governance and the performance of both intentional and unintentional coopetition would be positively correlated.

- *Hypothesis II(a): There is a positive relationship between relational governance and intended coopetition performance.*
- *Hypothesis II(b): There is a positive relationship between relational governance and unintended coopetition performance.*

5.4.1.3 *Dedicated Alliance Function*

Alliance functions is another crucial aspect of studies carried out in management literature concerned with IORs. Unsurprisingly, alliance functions have been studied extensively, as researchers, as well as organisations, have realised the benefits of alliances; which includes, enhancing market power (Kogut, 1991), increasing organisational efficiencies (Ahuja, 2000), providing the opportunity to enter new markets (Garcia-Canal et al., 2002), and allowing organisations access new resources and capabilities (Rothaermel & Boeker, 2008). The primary function of dedicated alliance function is the effective management of both individual and the entire organisation's alliance portfolio including activities such as; selecting strategic alliance

partners, initiating the relationships, negotiating the terms of the alliance, deciding on the structure and governance of the exchanges, adapting and dissolving the relationship. Through experiential learning, organisations that adopt a dedicated alliance function can ensure that the appropriate governance strategy is adopted for each of its strategic alliances. In the same vein, this function can ensure that their organisation is protected against opportunism that can arise as a result of interactions with external organisations.

From the exploratory study, the respondents agree that one of the practical manners to ensure effective management of a coopetition relationship is through the formation of either an in-house management team or the adopting the use of a third-party organisation to manage the alliance. Since literature identifies that using a third-party management organisation introduces additional tension to the alliance (Le Roy and Fernandez, 2015), this study focuses on the impacts of setting up a dedicated team to manage the alliance. The OGI is established as a highly competitive industry, and the exploration study shows that the industry is more inclined to transactional governance as a means of managing alliances in the industry.

Hence, it can be assumed that using a dedicated alliance function as a means to strategically manage a coopetitive relationship can imply the utilisation of a transactional governance mechanism.

- ***Hypothesis III(a):*** *There is a positive relationship between organisations that have a dedicated alliance function and the adoption of transactional governance.*

Similarly, organisations that adopt a strategic dedicated alliance function would be carefully select its partners, such that the alliance would occur in a trusting environment which promotes a positive coopetition outcome. Additionally, the exploration study stresses the importance of relational governance, particularly at the inception of the alliance. This implies that with a dedicated alliance team, partners that have been appropriately vetted, through thorough investigation and experiential learning would be selected for coopetition, indicating that relational governance can be adopted without the fear of opportunism.

- ***Hypothesis III(b):*** *There is a positive relationship between organisations that have a dedicated alliance function, and the adoption of relational governance.*

Additionally, from the exploration of the OGI, respondents recommended creating an alliance team to manage the coopetitive relationship to ensure a beneficial outcome. This team can only

be formed if the coopetition strategy is adopted intentionally. The deliberate coopetition strategy managed through an alliance team would also ensure positive performance.

- ***Hypothesis III(c):*** *The relationship between having a dedicated alliance function and the performance of intended coopetition is positive.*

From the hypothesis above, it is suggested that the reason for the positive correlation between the performance of intentional coopetition and a dedicated alliance team is because a suitable governance mechanism is utilised in managing the alliance. Hence, the governance mechanism is expected to mediate the positive relationship between using a dedicated alliance team and the performance of intended coopetition.

- ***Hypothesis III(c) ii.*** *Transactional governance mediates the positive effects of alliance function on intended coopetition performance.*
- ***Hypothesis III(c) iii.*** *Relational governance mechanism mediates the positive effects of alliance function on intended coopetition performance.*

5.4.1.4 *Tension Management*

In coopetition literature, there have been several studies regarding the most effective way to manage the tensions in the relationship. Coopetition authors have identified two primary principles of tension management, which is the separation (Bengtsson and Kock, 2000) and integration principle (Smith and Lewis, 2011), or the combination of the two principles (Fernandez et al., 2014). Some of the other tension management principles are co-management (Le Roy and Fernandez et al., 2014) and utilising an independent third-party management organisation to manage the distinct elements of coopetition. Nonetheless, studies have shown that having a structure in place to manage the tensions in a complicated alliance can influence the choice of governance mechanism adopted. The management structure, irrespective of its structure can ensure that measures are taken, to protect the interest of the alliance by ensuring that adequate transactional control measures are in place, and the coopetition exists in an environment with fewer chances of opportunism or risks, such that relational governance can be used as a control mechanism (Tidström, 2014).

Interestingly, several authors agree that tension management allows successful coopetition but can only be adopted when the parties are aware of the strategy they are engaged in (i.e. deliberate coopetition (Castaldo et al., 2010; Le Roy and Fernandez, 2015). Studies have shown a positive correlation between the various forms of tension management and the performance

of the IOR alliance. However, what remains unclear is how tension management affects the outcome of coopetition when the strategy is practised unintentionally. Based on Mintzberg and Water's (1985)'s assertion, there is expected to be a similar outcome, as such, it can be assumed that tension management can positively influence the performance of unintentional coopetition.

From the outcome of the exploratory study, most respondents agree that for the tensions in coopetition to be appropriately managed, the separation principle should be adopted, since the alliance is already complicated. The organisations would require clarity about which phase of the partnership they are in and can take measures to manage these elements effectively. Interestingly, (Res_02), advocates for co-management, where the industry impose industry guidelines to managing interactions, citing the regulation in the industry as a driver for this form of tension management. Nonetheless, since most of the respondents suggest the application of the separation principle, it becomes necessary to investigate the influence of the separation form of tension management on the performance of unintended coopetition. Hence, the following hypotheses have been proposed based on literature and the exploratory study.

- *Hypothesis IV(a): The relationship between adopting the separation principle of tension management and using a transactional governance mechanism to control the relationship is positive.*
- *Hypothesis IV(b): The relationship between adopting the separation principle of tension management and using a relational governance mechanism to control the relationship is positive.*
- *Hypothesis IV(c): The relationship between adopting the separation principle of tension management and successful unintended coopetition is positive.*

It is essential to investigate if the governance mechanism adopted in the alliance is the reason for the performance outcome. Can the governance mechanism being used be the reason for the positive relationship that exists between the adoption of separation form of tension management and the performance of unintended coopetition? Therefore, mediation effects should be assessed. In order to investigate these relationships, the following hypotheses are proposed.

- *Hypothesis IV(c) ii. Transactional governance mediates the positive effects of the separation principle of tension management on unintended coopetition performance.*

- ***Hypothesis IV(c) iii.*** *Relational governance mechanism mediates the positive effects of the separation principle of tension management on unintended coopetition performance.*

5.4.1.5 ***Supply Chain Flexibility***

The qualitative study, as well as extant literature, have shown that coopetition positively affects the SC of organisations, including organisations within the OGI. In order to enhance the understanding of coopetition, it is crucial to investigate how the flexibility of a supply chain affects the performance of both intentional and unintentional coopetition. From the review of the OGI, it was observed that organisations that prioritise flexibility are more inclined to engage in coopetition. The respondents as well as SC literature, suggests that organisations that have a flexible SC are proactive (Wood, 2012) and would, therefore, be open to more radical strategies to improve their competitive advantage which may positively impact the outcome of coopetition. Since the SCF is concerned with how organisations react to uncertainties within their business environment to ensure that they still retain or improve their competitive position (Upton, 1994); and to have a flexible SC, organisations need to work closely with their suppliers and other organisations within their SC network, which may include competitors. It is assumed that the experience of working with other organisations, especially at critical points, such as during a disruption would allow these organisations to obtain the needed experiential learning to engage in a successful coopetition relationship. Therefore, this study expects that having a flexible SC results in positive coopetition performance. These hypotheses are also in line with Kwok et al., (2015), who observed that having a lean, agile and flexible supply chain improves the rate of coopetition success in the smartphone industry. Hence, this study hypothesis the following:

- ***Hypothesis V(c):*** *There is a positive relationship between organisations that have a flexible supply chain function and the outcome of intended coopetition.*
- ***Hypothesis V(d):*** *There is a positive relationship between organisations that having a flexible supply chain function and the outcome of unintended coopetition.*

Additionally, since organisations with a flexible supply chain relies on their suppliers to ensure that a disruption is effectively and efficiently managed (Sinha, 2015), and have obtained experiential learning from working closely with other organisations in their network, it is assumed that these organisation would understand the need for transactional governance in their operations to ensure that their partner organisations are fully aware of their responsibilities, to ensure they perform as desired in the event of any disruptions. The

qualitative study found that organisations within the OGI that prioritises flexibility have a close working relationship with their partners and with the competitiveness in the industry, organisations ensure that their needs are met and handled as a priority from their partners. Therefore, this study hypothesises that an organisation with a flexible supply chain would be drawn to a transactional form of governance.

- ***Hypothesis V(a):*** *There is a positive relationship between organisations that have a flexible supply chain function and the adoption of Transactional Governance.*

According to Stevenson and Spring (2009), relational governance in IORs enables SCF in an organisation. From their review of the aviation industry, they observed that lack of trust among the key players in the alliances created uncertainties which negatively impacted on the organisational performance with regards to flexibility. Therefore, it can be assumed that there would be a positive correlation between SCF and relational governance.

- ***Hypothesis V(b):*** *There is a positive relationship between organisations that have a flexible supply chain function and the adoption of Relational Governance (Trust).*

The Interacting (Moderating) Effects of SCF

In addition to the effects of SCF on the performance of coopetition, this study seeks to uncover the nature of the relationship that exists between the interaction of SCF and using a dedicated alliance function on coopetition performance as well as having the ability to manage tensions.

From the qualitative interviews, the respondents show that one of the characteristics that make organisations flexible and increases the likelihood of engaging in coopetition is the close relationships between the organisations and other firms within their SC networks, and it was established that organisations that have a dedicated alliance function to manage IORs have a higher chance of success (Kale and Singh, 2009). Therefore, this study assumes that an interaction between the SCF and dedicated alliance function constructs would translate to a successful coopetition relationship. Similarly, this study seeks to find the effects of interacting SCF and tension management on coopetition performance. The ability to manage coopetition tensions as well as having a flexible SC, which is able to manage risks and disruption effectively, may improve the chances of successful coopetition. Therefore, the study proposes the following hypothesis:

- *Hypothesis VI(a): There is a positive relationship between the interacting effect of having a flexible supply chain and having a dedicated alliance function and the outcome of unintended coopetition.*

- *Hypothesis VI(b): There is a positive relationship between the interacting effect of having a flexible supply chain and having a dedicated alliance function and the outcome of intended coopetition.*

- *Hypothesis VI(c): There is a positive relationship between the interacting effect of having a flexible supply chain and the ability to manage tension and the outcome of unintended coopetition.*

- *Hypothesis VI(d): There is a positive relationship between the interacting effect of having a flexible supply chain and the ability to manage tensio, and the outcome of intended coopetition.*

5.5 CHAPTER SUMMARY

This chapter was separated into two distinct parts. The first phase of the section presented the results of the qualitative study, both conceptual clarification and the exploratory study of the UK Oil and Gas Industry. The latter part of the chapter was dedicated to developing the conceptual framework for the research and proposing specific hypotheses to investigate the effects of governance mechanisms and tension management structures on the outcome of deliberate and intentional coopetition.

The concept clarification revealed that the study is appropriately positioned in academic literature, and the key elements have been adequately defined. The exploratory study showed that while the OGCs are not aware of the term coopetition, the dynamics and principles of the relationship is not uncommon in the industry, with some evidence of the alliance at an industrial level (FPAL and JIP). The study, however, found that because of the legal risks and the regulation in the industry, organisations are hesitant to adopt the strategy. Further inquiry from the respondents revealed that transactional governance is the preferred mechanism to control the alliance, even though the benefits of relational governance was not overlooked. Additionally, the study found that the organisations are more open to the separation principles of tension management and realise the benefits coopetition can contribute to their SC capabilities. On the flip side, they also reveal that the flexibility of an SC can positively influence a coopetitive relationships as the organisations are prepared for any risks to its SC.

Subsequently, the conceptual model was developed. Even though the study did not rely on a particular core theory to the interactions in the model, it was underpinned by, RBV, TCE, Strategic Alliance theories. Some other theories, such as the Emergent Theory, and the social exchange theory were utilised to explain and justify the interactions between constructs. As a result, hypotheses, (direct and indirect effects), were proposed. These hypotheses would be tested using AMOS software for SEM. The process of collecting, analysing and preparing the data, would be discussed in the following chapter.

Chapter 6: THE QUANTITATIVE DATA

6.1 INTRODUCTION

The previous chapter which was divided into two primary phases analysed the outcome of the exploratory study of the OGI. It established that coopetition does exist in the industry, both intentionally and unintentionally. It also established the relationships of various coopetition constructs in attaining successful coopetition, for instance, the study shows that the OGI prioritises transactional governance over relational governance as a result of the highly regulated nature of the industry. The previous chapter also utilised the outcome of the exploratory study and literature review to develop some hypothesis and the conceptual framework for this study, which would be tested quantitatively.

This aim of this section is to discuss the approach adopted in collecting the quantitative data for this study. It follows from chapter three of this study which, highlights the research design, research framework and philosophy. This chapter focuses on the process of gathering the data for the quantitative phase of the research to test the proposed model. The section would discuss the instrument utilised for data collection, the sample size, the recruitment process and the challenges faced while gathering the quantitative data. It would also explain how the data was prepared for analysis including the cleaning, reliability and validity issues.

6.2 METHOD OF DATA COLLECTION

The choice of data collection method is based on the research question, the target audience, the sample size, and resource availability, with each technique having its strengths and weaknesses (Bryman, 2016). The most popular instruments for gathering quantitative survey data are face-to-face, postal, telephone, group administering and web-based (Bryman, 2016). The choice of the instrument determines the format of the questions and may influence the response rate.

Bernard & Bernard (2012) while summarising the characteristics of each survey instruments observed that the face-to-face method seems more suited to studies concerned with disadvantaged individuals such as the old or medically impaired individuals (blind) etc. Whereas, adopting the postal approach is suitable when attempting to reach respondents without access to telecommunication or internet, although, it has a low response rate and more useful when the researcher has access to a reliable contact database. Telephone-based surveys are ideal for gathering data concerning public opinion, while a group-administered study allows

data collection at a specific point in time. The web-based survey provides a fast, easy and flexible approach to gathering data. The web-based survey method was adopted for this study because of its flexibility, and it offered a more accessible option to reach the target audience. As a result of proximity, time constraints, as well as access to the potential respondents, this study uses the web-based data collection approach to reach the target audience. This method of data collection offers the researcher the opportunity to contact and reach the target audience without the ambiguity of having to mail the surveys to the respondents. The method also offers the respondents a more convenient means of participating in the survey, thus improving the response rate. The web-based data collection method would be discussed further in section 6.7 of this chapter.

6.3 QUESTIONNAIRE OBJECTIVES AND INFORMATION REQUIREMENT

As mentioned in section 4.5., the objective of the questionnaire is to obtain information from the required audience in a cost-effective and convenient manner, to test the hypothesised model in accordance with the aim of the survey. In order to achieve this objective, it is necessary to identify the information needed and categorise them appropriately. Shelton (2000), posits that factual, opinion and motive information (Table 6:1) are the three forms of information that can be gathered through a questionnaire.

Information Type	Characteristics
Factual	• Easily observable features or specific behaviours. • Can be used to categorise respondents. • Easy to ask and answer. • Examples: demographic, situational etc.
Opinion/Attitude	• Related to perceptions, beliefs and judgement. • Measures attitude, feelings and opinions. • Measures constructs that cannot be easily observed.
Motive	• Concerned with the reason behind opinions or behaviours. • Can be challenging to gather. • It is based on the subjective interpretation of the respondents.

	• Can be used to explain patterns or behaviours.

Table 6:1: Types of questionnaire information requirement.

Source: (Crouch and Housden, 2012; Shelton, 2000).

For this study, the interest of the researcher was to measure the respondent's perception about the relationships and influences of governance mechanism, tension management structures and supply chain factors on the intentional and unintended coopetition performance; thus, most of the information required is opinion information. Additionally, to allow more detailed analysis, the need to categorise the respondents, to describe the respondents necessitated the collection of factual information. These elements, regarding the type of information required, are described further in this section, to set the scene for the questionnaire design. It should be noted that the qualitative data gathered in the previous chapter (see section 5.3) comprised of motive information. It gathered subjective data from the respondents their motives for engaging in coopetition relationships and the management of the alliance.

Factual Information

The information required here is about the respondents' demography and situational conditions. The questionnaire included some elements to ascertain the factual nature of the respondents, demography, historical experience with the supply chain function. The categories of factual information are highlighted as follows.

1. **Demographics:**
   a. Education: It is useful in developing the respondents' profile and can provide additional information about the differences in perception based on formal education.
   b. Management Level: This provides an opportunity to test how the respondents' management level affects their perception of coopetition.
   c. Type of Employment: This helps to check if the form of respondents' employment has any impact on their perception.
   d. Size of organisation: The size of the respondents' organisation may have an effect on how they perceive coopetition.

2. **Historical Information**

a. Length of Supply Chain Experience: The length of SC work experience, act as a filter question to establish expertise and also check the relationship between the respondents' SC experience and perception of coopetition.

3. Situational Information
   a. Involvement in SC function: Establishes that the respondent has been involved in the supply chain of an organisation. This also serves as a filter question for qualifying for the survey.

Opinion Information

The opinion information formed most of the questions in the questionnaire, and it relates to how the respondents perceive the influence supply chain on the formation and outcome of coopetition. The questions are divided into various constructs crucial to measuring the perception of coopetition, some of the constructs include; Tension Management, Alliance function, Transactional and Relational governance etc. These constructs would be discussed further in the chapter.

6.4 DESIGNING THE QUESTIONNAIRE

The aim of designing the questionnaire is to provide the most appropriate tool to investigate the impacts of the management, governance and SCF on the outcome of intentional and unintentional coopetition and to test the hypothesised model. Therefore, the study follows (DeVellis, 2017; Fowler, 2014), to generate items and determine the reliability and validity of the instruments used. The measurement constructs were identified from the literature, and additional measures were obtained from the qualitative study.

Following the information requirement and the identification of the constructs to be measured, the items were generated from previous studies conducted on the identified constructs (i.e. coopetition and supply chain) and modified for the current study, where there was an absence of measurement questions, items were developed based on the outcome of the qualitative research. Table 6:2 below highlights the items generated and their respective sources (the operationalised questionnaire for the study click here has been appended in the appendix section). After the items were generated, the questionnaire was tested to ensure its contextual

and content suitability for the study. As such, the design phase of the questionnaire was particular about the validity and reliability of the scales.

Constructs	Questionnaire questions	Sources	Code
Transactional Governance	Our collaboration is regulated through a comprehensive, clearly worded contract.	Bouncken, Clauß and Fredrich, 2016	Contract_1
	The contract with our partners describes in detail every aspect that we think is of interest.		Contract_2
	We and our partners fix all the collaboration related details in a contract		Contract_3
	We are hesitant to transact with our partners when the specifications are vague		Contract_4
	A contract is a necessary condition for coopetition	Exploratory Study	Contract_5
	Contracts are more important than trust in a collaborative relationship.		Contract_6
	We rely on contracts for all alliances outside our organisation		Contract_7
Relational Governance	Our partners keep promises made to our firm.	Bouncken, Clauß and Fredrich, 2016	Trust_1
	Our partners are always trustworthy		Trust_2
	Our partners have always been even-handed in our collaborations.		Trust_3
	Our partners do not require close supervision		Trust_4
	Our partners are truthful		Trust_5
	Competitors cannot be trusted	Exploratory study	Trust_6
	Trust is necessary for coopetition.		Trust_7
Alliance Function	We have a dedicated organisational unit managing inter-organisational activities	Bouncken and Fredich, 2012	All.Fun_1
	We permanently use dedicated alliance managers		All.Fun_2
	We regularly carry out standardised assessments of our alliances		All.Fun_3

	An independent resource management team is vital when competitors collaborate.		All.Fun_4
	We use a dedicated alliance team to monitor communication in interactions outside our organisation	Exploratory Study	All.Fun_5
	Our alliance team determines the form of inter-organisational relationships to adopt.		All.Fun_6
	Our alliance team are proactive		All.Fun_7
Managing the tensions	Our alliances are monitored regularly		Man.Ten_1
	The industry regulates alliances outside our organisation		Man.Ten_2
	The pre-competitive phase should be managed separately from the competitive phase.	Exploratory Study	Man.Ten_3
	A separate team manages the competitive phase of the relationship.		Man.Ten_4
	A different team manages the collaborative phase of the alliance.		Man.Ten_5
Intentional Coopetition	We are in close competition with our alliance partners		ICP_1
	We are collaborating with competitors to achieve a common goal	Bouncken and Fredich, 2012	ICP_2
	We find it important to have active competition with our collaborators		ICP_3
	We are deliberate about all our inter-organisational relationship	Exploratory Study	ICP_4
	We are familiar with coopetition		ICP_5
Unintended Coopetition	We have engaged in unplanned collaboration in the past		UCP_1
	Competitors often collaborate in my industry.		UCP_2
	I have had to work closely with a competitor in the past	Exploratory study	UCP_3
	Our industry encourages collaboration		UCP_4
	Collaboration should only occur between indirect competitors.		UCP_5

	Collaboration is more profitable between direct competitors.		UCP_6
	Our supply chain is reactive		UCP_7
Supply Chain Function	We have multiple suppliers for each item in our production.	Pujawan (2004)	SCF_1
	Collaboration helps us respond quicker to crisis	Chowdhury and Quaddus, 2017	SCF_2
	We have collaborative relationships with our supply chain partners	Chowdhury and Quaddus, 2017	SCF_3
	You can encourage collaboration between your suppliers.	Exploratory Study	SCF_4

Table 6:2: Measurement Scale

6.4.1 Level of Measurement

Measurement has been described as the act of recording observations in a research endeavour (Bryman, 2012). In business studies, it is essential that the concepts to be measured are clearly defined to determine the measurement technique (Zikmund, 2000). The level of measurement or scaling helps the researcher interpret the data gathered by offering a classification system that describes the nature of the information within the values assigned to variables (Bryman, 2012). An awareness of the various levels of measurement is helpful in determining the method of statistical analysis to be utilised. In concurrence, Pallant (2013) suggests that the choice of the mathematical methods to be used depends on the level to which a variable is measured. For example, data that would require a multiple regression method of analysis should not be obtained using an ordinal scale as it violates the fundamental postulation of the statistical tool. Therefore it is essential to distinguish the four levels of measurements which are; nominal, ordinal, interval and ratio (Smith, 2019).

- Nominal Scale: This form of measurement scale is used to categorise and classify data. Objects are assigned letters or numbers for identification or categorisation purposes. The numbers that may be assigned to the variables to do not have numerical value or relationship, classifying the data for frequencies or percentages. An example is assigning the female gender 1 and male 2 (Bryman and Cramer, 2005).

- Ordinal Scale: This form of measurement scale is used to rank items based on defined characteristics. Objects are ordered systematically based on their magnitude, without an indication of the degree of difference between the subjects. For example, measuring a variable in order of importance such as: strongly disagree, disagree, undecided, agree

and strongly agree. It is most common in management and social science studies, as they are concerned with ranking preferences (Sapsford and Jupp, 2006).

- Interval Scale: The interval scale measures order in units of equal distances. Unlike the ordinal scale, if the degree of distance between the variables are known and are similar, then it can be classified as an interval. In this form of measurement, the differences between the two variables are statistically meaningful, as they are measured in actuals and not in a relative manner. The interval scale is assumed to be a lower form of measurement in comparison to the ratio scale because the zero points are arbitrary (Frankfort-Nachmias and Nachmias, 2008).

- Ratio Scale: This relates to absolute scales, beginning with an absolute zero – which implies an absence of the attribute. Ratio scale has been described as the most powerful and informative of all the measurement scales since it provides the actual value differences between two variables in a scale. It has a true zero; hence, the differences between variables are meaningful. The ratio scale helps to understand the ultimate-order, interval, values and the true zero characteristics is essential in calculating ratios. Typical uses of the interval scale are to measure, height, age, weight etc.

The choice of measurement scales adopted in a study is dependent on the objective and proposed outcome of the study, and it also influences the method of data analysis. For instance, if an investigation is primarily concerned with summarising or describing a set of data, the categorical nominal scales are adequate. Whereas, if the study seeks to compare attributes or measure levels, then the most suitable scale would be ordinal. Interval or ratio scales may be considered ideal for studies which aim to examine relationship or association of non-categorical variables. It should be noted that the variable being measured defines the measurement scale and not the numbers they are assigned.

This study adopts two primary measurement scales, the nominal and the interval. The nominal scale was utilised to collect categorical variables, such as the amount of work experience, management level etc. While the interval scale was used to collect data relating to the coopetition and SC constructs, with the variables, ranked on a five-point Likert scale, ranging from 'strongly disagree' to 'strongly agree'. The choice of a five-point scale as opposed to the alternatives (e.g. 7-points, 9-points), was informed by Fink (2016)'s assessment that the other scales offer no additional empirical advantages over the five-point scale.

There have been arguments regarding the treatment of Likert scales, with some authors suggesting that they should be treated as interval measures since the numbers assigned to them are used to rank the cases and not the actual measurements, which allows the data to be analysed with statistical interval tools (McNabb, 2015; Garson, 2012). While authors like (Bertram, 2009; Judd et al., 1991), argue that Likert scale should be used for ordinal variables since it is difficult to determine the differences between respondents' perception of a construct for instance if the difference between 'strongly agree' and 'agree' are the same as the difference between 'agree' and 'undecided'.

A notable study conducted by Brown (2011), stresses that there is a difference between Likert scales and Likert items, adding that the combination of Likert items which are ordinal in nature make up an item scale, which is then treated as an interval. According to Brown (2011), Likert scales contain several items which can be taken to be interval scales for descriptive and other significant statistics such as factor analysis, correlational analysis etc. to be carried out provided the necessary design conditions are met.

Rasmussen (1989), argues that provided a multi-scale item has a minimum of five points, its precision of statistics would be uncompromised and applying parametric procedures would not have a significant implication to the outcome of the study. As a result, the most rating scale used in research such as the Likert scale has more than five response categories and usually comprises of a middle point which represents neutrality and extreme points that represents the differences between the constructs being measured (Preston and Colman, 2000). The researcher, therefore, agrees with the stance, that if designed correctly, the Likert scale can be utilised in interval scales. In line with Brown (2011), adopting the interval scales is consistent with the requirement for SEM analysis, which justifies the decision to adopt the Likert scale in the interval scale.

Additionally, there is no consensus regarding the optimum number of scales on a Likert scale. Studies have shown that more than five scales can be utilised in research but would contain a varying degree of reliability. For instance, Preston and Colman (2000), discovered that the 10-point scales are the preferred choice for respondents, because of the several choices offered while the five-point scale is also preferable to the researcher because of its ease-of-use. Joshi et al. (2015), argues that the higher point scales offer varieties of options which increases the chances of meeting the objective realities of the respondents.

The study adopts a five-point rating scale to measure the participants' opinion. The coopetition and SC constructs were measured using items scored on a five-point rating scale, on a 'Strongly Disagree' to 'Strongly Agree' range as suggested by (Oppenheim, 2000). Additionally, Fink (2016) argues that the higher scales do not offer any empirical advantages over the five-point scales. Dawes (2008) also adds that there is no significant statistical difference between the lower and higher scales with regards to the standard deviation, kurtosis and skewness. However, the data reliability and validity are improved with smaller scales, but the mean in the higher scales are lower with more data dispersion around the mean (Dawes 2008).

With regards to the questionnaire design, the items were classed into various sections in line with the model. The categorical and demographic questions were located at the end of the questionnaire, to avoid discouraging participants, as they may not motivated to answer personal questions relating to work experience, management levels. This design is in line with Suresh (2014)'s sandwich theory discussed in section 4.5.

6.5 INSTRUMENT VALIDITY AND RELIABILITY
6.5.1 Questionnaire Validity
The validity of a questionnaire relates to the amount of systematic error in the measurement instrument, which can be established through a panel of experts or field studies such as pilot testing. Depending on the nature of the study, the validity may take the form of content, face validation, construct or criterion (Norland, 1990). According to Radharkrishna (2007), the aim of questionnaire validity is to answer specific questions about the questionnaire, using a field test and expert review. The questions include:

- The validity of the questionnaire. i.e. Is the instrument measuring what it intends to measure?
- Is the instrument able to provide answers to the research questions?
- Does the questionnaire represent the content?
- Does it look like a questionnaire?
- Is the questionnaire suitable for the target population?

In this study, the content and construct validity had been established through the conceptual clarification interviews and the initial qualitative interviews which were conducted prior to designing the questionnaire. As a result, the validity at the pre-test phase was confirmatory to ensure that the questionnaire was fit for purpose, and the questions reflect the constructs. In

order to ensure accuracy, consistency and comprehension, the questionnaire was pre-tested before the pilot study, using experts within the host university. This method of pretesting was chosen for this study, as most of the questions adopted in questionnaires had been tested and pre-validated in previous studies. Despite the questionnaire items being informed by other related studies, it was essential to pre-test the questionnaire for validity as the items needed to be applicable for the specific context being investigated. The expert panel was used to validate the questionnaire, because it offered a cost and time effective approach to ensuring validity, without compromising on the quality of the outcome. Although, it can be argued that not pre-testing on a subsample of the target population may be disadvantageous since it would be impossible to ascertain the level of response behaviour. The researcher had validated some of the items at the interview phase with potential members of the target population.

The aim of pretesting the questionnaire includes:

- To determine if the questionnaire is fit for purpose. i.e. are the constructs interpreted as intended?
- To uncover any sources of misunderstanding or confusion in the questionnaire.
- To reveal any grammatical errors, including punctuations and misspelling.
- To ensure there are no offensive contents in the questionnaire.

In line with Fowler (2014), the participants for the pre-test were selected using the purposive sampling technique. The participants' selection was based on the judgment of the researcher regarding their expertise in the subject matter and research methods. A total of 15 academics within the host university were selected from the host university. The participants were sent a link generated from google form ([click here](#)). Upon receiving the completed responses, the respondents were contacted personally to discuss their opinion and suggestions about the questionnaire. The feedback from the questionnaires confirmed that it is fit for purpose and easy to complete. It also showed that the questionnaire was designed with clarity. However, some of the participants suggested the removal of some items which appeared to be repetition and unnecessary and to remove some of the ranking questions (see Table 6:3). The researcher analysed these discussions in relation to the reviewed literature and in consultation with the supervision team. Consequently, some items were reframed or rephrased while a number redundant of items were dropped. For example, '*we deliberately enter every inter-organisational relationship*' was changed to '*we are deliberate about all our inter-organisational relationship'*. Additionally, some errors relating to grammar and spellings were

identified and corrected, the main introduction section was included, along with descriptions of the aims for each part of the questionnaire.

Item Removed	Reason
I have had to work closely with a competitor in the past.	This question is similar to 'how often do work with competitors on a project'. In order to avoid repetition, the question was removed.
Trust eliminates opportunism in coopetition.	This question was removed because of the word opportunism. The participants suggest that the word opportunism in this context is open to interpretation.
Rank the critical coopetition success factors in order of importance	This item was removed because it was not answering any of the research questions. It was, therefore, deemed unnecessary for the study.

Table 6:3:Questionnaire Items Removed

Additional changes made to the study instrument, as a result of the validity test are as follows:

1. The Likert scale was adjusted from six-point to a five-point scale. The initial questionnaire aimed to avoid a mid-point and force respondents to take a side on the to agree to disagree spectrum. The questionnaire initially was based on six scales. However, feedback from the pilot study showed that it made the instrument more stressful, also since it is statistically irrelevant, the final questionnaire adopts a five-point Likert scale.

2. Introduce a cut-off question. A question was introduced at the beginning of the question to inquire about the respondent's familiarity with IORs. This served as a cut-off question to eliminate respondents who had no knowledge of the dynamics of IORs, which would, therefore, improve the quality of the responses.

These recommendations coupled with the outcome of the conceptual interview and the initial qualitative interviews were utilised in designing the final data collection instrument for the study.

6.5.2 Questionnaire Reliability

The term reliability generally refers to the consistency of a measure. It is primarily concerned with the random error in the measurement and accuracy of the measuring instruments (Radharkrishna, 2007; Norland, 1990). The nature of questionnaire design, which usually comprises of multiple measurements per construct, makes the test for reliability essential. A questionnaire adopts multiple items to test a specific variable as a statistical approach to reduce or eliminate error and obtain a valid score for the variable.

The piloting phase of a study allows the researcher to observe which items add value in the questionnaire and which items can reduce the random error of the instrument. As mentioned in the section above, the validity of an instrument can be established through pretesting, but the instrument's reliability can be tested through a pilot study.

According to Peterson (2000), testing the reliability of a questionnaire allows the researcher select items which are internally consistent and have optimum difficulty, as well as provides the opportunity to check responses for issues such as floor or ceiling effect and central tendencies. An example of this issue is if all respondents give a similar answer to an item (e.g. they all agree), then the item may not be useful since it cannot help to differentiate between the categories of respondents that agree with the item. Optimum difficulty refers to the optimal proportion of which the respondents would either agree or disagree. Subsequently, one of the objectives of a reliability test is to ascertain the item difficulty and remove items with zero variances or extreme means.

The pilot study is an essential phase of research as it establishes the reliability of interrelationships between different elements of the questionnaire, including the data inputting, coding, analysis, processing and evaluation. Additionally, the piloting stage allows the researcher to review the study's design based on a subset of estimated final data, which suggests that the pilot study can inform the final execution of the research study by checking if the questionnaire measures what it intends to measure.

Although the ideal audience for a pilot study is a subset of the research's target population, this is to ensure consistency in how the pilot study and the final study would be executed and evaluated. Moser and Kalton (2005), revealed that the size and audience of a pilot study should be determined by convenience, cost and time, implying that an alternative sample audience with similar characteristics with the target population can be adopted to save time and money. In addition, Rhadakrishna (2007), suggests that between 20 to 30 respondents are adequate

sample size to test the reliability of the instruments in a pilot study depending on the number of items in the instrument to be tested.

Consequently, the pilot study was conducted using 24 individuals, comprising of 12 colleagues in the doctorate program, 8 academic staff members of the host university, and 4 oil and gas professionals who participated in the qualitative interview.

The literature identifies several criteria to measure the reliability of an instrument; however, internal consistency and reliability of scale are the most common concerns researchers face in quantitative studies (Rhadakrishna 2007). A combination of item-scale correlation squared multiple regression, and Cronbach's Alpha is usually used to test the reliability of an instrument. These tests are utilised to make informed decisions about retaining or deleting an item in the measurement instrument. Rhadakrishna (2007), stresses that care must be taken when deleting items, adding that not more than 20% of the original items in a construct can be removed from the measurement instrument.

The data collected from the pilot study was subjected to a Cronbach's Alpha reliability test using the SPSS software. The literature recommends a cut-off point reliability coefficient of .70 for Cronbach Alpha (Rhadakrishna 2007). Following the Cronbach's Alpha test, there were no problematic items, as all the constructs were above the .70 threshold. This outcome is not surprising as most of the item in the questionnaire was previously tested and validated in coopetition studies.

After establishing the reliability and validity of the measurement instrument, the questionnaire was deployed for the final data collection.

6.6 SAMPLING DESIGN
6.6.1 Research Population
When conducting research, one of the decisions a researcher needs to make is whether to conduct a survey using the entire population or a sample that represents the population. Surveying the whole population may be impractical or expensive to achieve in many instances, selecting a representative sample is more appropriate in these instances. Pallant (2016), argues that sampling is one of the significant challenges in conducting empirical research as it is challenging to obtain a sample that is credible, comprehensive and representative of the population. To address this, sampling procedures which allow the members of the population

equal opportunity to be selected or exclude based on pre-defined criteria have been suggested by several authors (Fink, 2016; Fowler, 2014).

The research population of interest in this study are professionals employed in a UK Oil and Gas organisation. More precisely, this study targets individuals in management positions or those that have been expertise in IO interactions within the industry. However, the number of the target population is unknown. According to Plümper and Neumayer (2012), there can be uncertainty regarding the target population and sample size, and the sources of this uncertainty include, under-specified theories, unobservable population boundaries, model complexities, and sampling problems. In this instance, the source of population uncertainty can be attributed to unobservable population boundaries.

There seems to be a disparity in the amount of employment reported by the OGI and the national statistics. While the UK OGI estimates that industry accounts for 170,200 jobs both directly and indirectly, with direct accounting for 28,300 of these jobs (Oil and Gas UK, 2017, p17), ONS (2017) approximates that 31,600 individuals are directly employed in the industry in the same timeframe, with an estimate of 19,400 providing support services to the oil and gas extraction role. However, none of the available statistics distinguishes between specific job roles or management levels, which makes it difficult to determine the target population.

Consequently, the exact population of OG professionals involved in IO interactions is unknown. Howevr, this study assumes that there is a high likelihood of individuals in a management position to be involved in a IORs. The OGC, estimates that the ratio of employees to managers in the industry is 4:1 (Oil and Gas UK, 2017). Therefore, going by the Oil and Gas UK (2017), estimate of OGI employees (direct and indirect) which is 170,200, it is assumed that about 42,550 individuals are employed within a management role in the OGI.

Based on the caluculation of the ratio of employees to manager, and the estimate of employees in OGI employment, this study assumes a population size of 42,550. Nonetheless, it is impossible to survey all members of the target population because of a lack of resources and time in this study.

6.6.2 The Sampling Frame
Following the identification of the target population, which was roughly estimated at 42,550, including the uncertainty in calculating the exact population size, coupled with the impracticality of utilising the entire population in the study, necessitated the need for sampling frame to set-up the population in a usable format (Fowler, 2014).

Ideally, since this study is concerned with how organisations interact amongst themselves in the industry, the most suitable level of measurement would have been organisational. However, due to the restrictions in the industry, particularly with sharing sensitive information about their IORs, an individual level of measurement was adopted. By targeting individuals expected to have been involved in an IOR, insights about the nature of interactions can be uncovered.

Hence, the sampling frame utilised, which indicated the profile of organisations by industry was the Financial Analysis Made Easy (FAME). In addition to this database, internet recruitment using LinkedIn, which states the industry, job profiles and management positions of the individuals were also adopted.

Initially, the option of recruiting respondents using a third-party data collection company was explored, and some data was collected using the company QuestionPro to recruit participants. However, the research could not ascertain the quality of the respondents and the quality of the data gathered, as the data collection technique was unknown since it was unclear how the company recruits its respondents. Consequently, the data was abandoned, and other methods of recruiting participants were explored.

The other sampling frame that was considered was based on referral only (snowballing). This technique was abandoned as it did not provide the members of the population an equal chance of being selected. In addition, this sampling method offered only a few participants the opportunity to participate, thus, reducing the number to participants. Even though some samples were selected based on referrals, it was not the primary sampling frame.

The sampling frame of selecting participants from a pool of organisations identified from the FAME database and LinkedIn, reflects the entire population required of oil and gas professionals, even though only those with a social media presence and work in a registered oil and gas extracting company were able to be recruited.

6.6.3 The Sampling Procedure

As discussed earlier, there are two main techniques of sampling in management research, which are probability and non-probability sampling (Creswell, 2014). In probability sampling, every member of the target population as the same chance of being selected, whereas the non-probability sampling technique allows the researcher to use their judgement to choose participants based on availability or convenience. The quantitative phase of this study adopts

the probability sampling method, enabling participants to be selected, either statistically or scientifically from the sample frame discussed in the previous section.

Probability sampling can be further sub-grouped into four categories; simple random sampling, systematic sampling, stratified and cluster sampling (Bryman, 2015). However, Fowler (2014) argues that a strict random sampling procedure is not necessary for probability sampling, provided all members of the target population have an equal opportunity of being selected.

Even though this study sought to represent the UK Oil and Gas professionals that have been previously engaged in IO interactions as precisely and accurately as possible, obtaining details of individual job roles proved impossible. Additionally, as a result of the enforcement of the UK Data Protection Law, obtaining personal details such as the contact details, specific job description and employee profile of staff in OGC was not permitted and not available in public domain. Millar and Dillman (2011) also stress that it is inappropriate to send personal emails to individuals without first establishing a relationship.

This study adopts two significant approaches to recruit participants for the study. To ensure that employees from a vast pool of OGC were sampled, since there are varying sizes of UK OGC, as well as avoiding a large pool of respondents from the same organisation, the initial approach was the use of a pre-defined sampling frame on the FAME database, to identify OG organisations for the study. Individual respondents were then selected from within the organisations identified. However, the response rate with this approach was low; hence, a second approach was utilised, where individuals from the organisations identified from the sampling frame were recruited through social media (LinkedIn).

On the FAME database, the criteria for the organisation needed was entered into the database, based on its activities and industry classification. After selecting various classifications relating to Oil and Gas, a total of 490 active organisations were identified (Figure 6:1). Upon retrieving the list, a total of 250 companies were selected using research randomiser to ensure that each organisation had an equal chance of being selected. Subsequently, only 204 of these companies had contact details in the public domain. Letter of introduction, clearly stating the aim of the study and the required participants for the study as well as an invitation to participate were sent to the selected companies. Additionally, telephone calls to the selected organisations were made to introduce the study and inform the organisations of the target participants.

Figure 6:1: FAME output of Extracted UK OGC

However, the drawback of this sampling procedure is that it was impossible to determine if the survey link was distributed within the selected organisations and also to the correct target audience. Therefore, the researcher made direct contacts with some of the organisations in the host city based on proximity and convenience to distribute the survey links. Despite these efforts, only 25 organisations from the 204 organisations in the sampling frame, responded to the survey, accounting for a total of 49 completed survey responses. Although it is not possible to estimate the non-response rate for this sampling approach as it is unknown how many surveys were distributed within each organisation and the number of managers in each organisation is not known, the non-response rate is estimated to be 88% of the invited organisations. Therefore, owing to the low response rate, other means of recruiting research participants were considered.

As an alternative, this study, utilised social media to reach the desired respondents. The organisations identified in the sampling frame was used as a primary criterion in recruiting the respondents from LinkedIn, a networking platform. Only individuals that are affiliated with the organisations were contacted to partake in the study.

Several studies have shown respondents can be recruited using social media or other internet-based methods (Nulty, 2008; Van Selm, and Jankowski, 2006). These studies show that the internet-based surveys offer a cheaper, comprehensive and more accessible means of reaching respondents which may otherwise have been difficult to reach, without compromising on the quality of the data.

LinkedIn is a social networking site designed specifically for the business community. It is being marketed as the world's largest professional networking site, boasting of hundreds of

million members (LinkedIn, 2019). The study utilised LinkedIn Premium, a paid version which offers additional benefits by allowing the user contact direct contact (referred to as InMail) to any member within the networking site.

With the LinkedIn premium, specific search and filter options were selected, such as the current job description, the location, the industry and current company names. The researcher input the required criteria into the search engine, (i.e., management for the job description, the UK for the location, Oil and Energy Industry as the required industry and finally the 204 organisations obtained from FAME. A total of 6,564 individuals fit into the required criteria. The research randomizer website was again utilised to avoid self-selection bias, and allow the researcher to select participants randomly. A letter of introduction and invitation to participate in the study were sent via LinkedIn's InMail to a total of 500 respondents. This approach generated a response rate of 68%, accounting for 343 responses.

6.6.4 Sampling Units and Sample Size

As mentioned above, the sampling unit adopted in this study are individuals employed within the OGI in the UK. Seeing as the survey is interested in investigating the performance outcome of intentional and unintentional coopetition, based on pre-identified factors, it may have been more appropriate to adopt the organisations as the unit of analysis rather than individuals. However, since there are no publicly known examples of coopetition in the industry, and owing to the competition in the industry, organisations are hesitant to reveal the strategies that they adopt. There are no governing agencies that publish a list of IORs in the industry; as such, it was impossible to identify organisations that have been or currently involved in coopetition (excluding the organisations involved in JIP, identified in the previous chapter).

Additionally, due to ethical limitations, resulting from the need to obtain sensitive and private organisational information limit the researcher's ability to discuss the essential elements that may be beneficial in the study on an organisational level. Therefore, the study uses individuals to weigh the perception of coopetition in the industry, as well as to check its impacts on governance and management structures. Therefore, it is expected that measurement error may be present, justifying the use of SEM to account for these errors (Kline, 2015).

Even though a sample size which is statistically significant is required in SEM analysis, the exact number is still up for debate (Bagozzi & Yi, 2012; Iacobucci, 2010; McDonald & Ho, 2002). While some authors recommend a sample size between 100 and 150 with a minimum

of three indicators per construct is appropriate for SEM analysis (Ullman, 2006; Anderson & Gerbing, 1988), others argue that a smaller sample size, such as 50, yields convergence validity (Iacobucci, 2010), stressing that larger sample sizes magnify the statistical significance of the results (Sekaran, 2009). Nonetheless, Roscoe (1975), recommends that the appropriate sample size should be between 30 and 500, depending on the level of complexity, desired precision and degree of confidence required. Therefore, this study deems a sample size between 250 and 500 suitable.

6.7 INTERNET (WEB) BASED SURVEY

The use of internet or web-based platforms for data collection in empirical research has been on the rise since the world wide web became popular, with authors even suggesting that the approach may replace traditional forms of surveys (e.g. postal) (Fisher & Herrick, 2013; Barrios et al., 2011; Cook et al., 2000; Couper 2000). Mavletova, (2013) argues that this increase in the usage of web-based platforms is influenced by the rate of the upsurge in internet technology, with devices such as smartphones and tablets enhancing the accessibility of the internet. The web-based survey covers platforms such as Hypertext Mark-up Language (HTML), email, social networking sites, requiring participation from individuals with access to the internet.

Several studies across many disciplines have been conducted to understand the usefulness of web-based surveys and to justify its use for empirical research (Ravert et al., 2015; Barrios et al., 2011). These studies have compared the web-based survey approach to its paper-based counterpart, with a focus on its advantages and disadvantages, response rate, issues relating to accessibility and sampling (Ravert et al., 2015; Fisher & Herrick, 2013; Barrios et al., 2011; Wright, 2005).

The principal argument regarding the use of the web-based survey is that the increasing rate of information technology provides more opportunities with a cost-effective data collection option for researchers. Studies show that the web-based surveys are more advantageous alternatives to the conventional paper-based data collection method, with benefits such as, cost and time effectiveness, ability to access real-time data, allows more extensive coverage, increased interaction with respondents, reduction in data entry errors and design efforts and improves data quality (Ravert et al., 2015; Orr, 2005; Cook et al., 2000).

Studies stress that web-based surveys are more cost and time-efficient, especially in comparison with postal surveys (Cobanoglu et al., 2001; Schleyer and Forrest, 2000). However, Barrios et al. (2011), found that the data quality especially relating to missing data and errors in open-ended questions, can be higher in web-based surveys than postal surveys. In order to avoid these errors, closed-ended questions were adopted in the questionnaire, and specific filter questions and checks were included in the questionnaire. This study utilises web-based surveys to distribute the questionnaire. The questionnaire was developed using a web-based instrument-google forms; after developing the questionnaire, the google form platform allows the questionnaire to be distributed via emails or by clicking on a generated link. This study distributes the questionnaire via the link generated from the platform. Additionally, as mentioned above, the research participant was recruited using LinkedIn a social networking platform.

6.7.1 Strategies to Improve Response Rate

As mentioned above, many studies have shown that the response rate in web-based surveys is higher than their paper-based counterparts (Orr, 2005; Cook et al., 2000). Even though some studies insist that the response rate in postal surveys are higher in postal surveys (Fisher & Herrick, 2013; Kaplowitz et al., 2012), other studies, for instance, Barrios et al. (2011) found that about 64.8% of internet surveys were returned while 48.8% of postal surveys were returned suggesting the response rate is higher in web-based surveys.

Barrios et al., (2011), argues that the response rate can be affected by many factors including, the sample characteristics, methodological differences, questionnaire design, internet penetration, which may be responsible for the mixed views of response rate in web and postal surveys. Notwithstanding, Fan and Yan (2010), grouped the factors that can influence response rate in web-based surveys into four distinct categories. These factors include survey development, which is concerned with content and present of web questionnaire; survey delivery, relates to the method of sampling, contact delivery, invitations, reminders, incentives; survey completion, which involves participation and participation decisions and survey returns concerned with survey software and data safety. These factors were taken into consideration while conducting the survey and contributed to the response rate.

One factor that significantly affects the response rate is the rate of internet penetration in various parts of the world. For instance, the rate of internet penetration is higher in developed

countries in comparison to developing countries, especially in its use in organisations. The rate of internet penetration was not an issue in this study since the research is carried the UK, where 90% of adults are internet users (ONS, 2018), and the UK ranked among the top five of LinkedIn users by country, accounting for over twenty-six million users (LinkedIn, 2019).

Some challenges that could arise in web-based surveys and affect the response rate are lack of reliable population or sample size, selection bias or lack of randomisation, which may be because of insufficient knowledge of the sampling frame. In order to address this, a target group should be identified or taking extra steps to ensure randomisation. As discussed in section 6.6.2, this study utilises a sample frame and a randomising tool for selection.

Furthermore, Cook et al., (2000) factors such as offering incentives, pre-contact, the importance of the issue being studied, increasing the number of contacts, personalised contacts and pre-contacts can increase the response rate in web-based surveys. Some of these factors were utilised to increase the response rate in this study. Even though this study did not offer any incentives to the respondents, contacts were made to the respondents before sending out the survey link. pre-notification was also used, as the respondents were first contacted with a letter of introduction and invitation to participate, with the survey link sent only after confirmation of interest. The invitations sent to the respondents via LinkedIn was not a generic email. Each participant was sent a personalised email, addressed to them and acknowledging their current job description (e.g. Dear Mr/Ms XYZ, I noticed that you work as a Business Development Manager at XYZ company). According to Cook et al. (2000), these factors may have influenced the response rate of the study.

Notably, the cover letter did not stress the importance in order to avoid introducing bias to the study since some of the respondents may be unaware of the coopetition study and discussing elements of the study mainly centred around unintentional coopetition may be affected.

6.7.2 Challenges Encountered in Web-Based Survey

The sections above have focused on the advantages and opportunities of adopting web-based surveys both in this study and management research. However, there are some challenges that can occur in web-based studies. This section discusses the personal challenges the researcher encountered while collecting data using the web-based survey approach. It should be stressed that these challenges may not be applicable in all web-based survey context.

The most difficult challenge was in recruiting the participants for the study. It was challenging to identify the population size because there is no existing database that lists or has a statistic about the number of management positions and roles both in the UK and in the OGI, which is the research's focus. Therefore, the OGCs had to be the initial point of estimating the target population. Additionally, after identifying and streamlining the organisations in the industry, a challenge of contacting the professionals became an issue. Many of the organisations contacted did not respond to the emails and phone calls made to them regarding the study. Some of the companies were hesitant in sharing employee details, owing to the data protection laws in the UK, so it was difficult to reach the target audience. Other efforts had to be considered, which involved the use of the internet to recruit the participants directly.

The internet site used to recruit the respondents was LinkedIn Premium. LinkedIn Premium comes at a cost, depending on the package selected. For this study, the most suitable package was the Business Package, which cost £50 per month and offers only 15 monthly InMail. Since more than 15 InMail were required and a considerable amount of time was required for the data collection, the researcher paid for the LinkedIn premium subscription for 4 months and purchased additional InMail costing £1 each for additional InMail. Therefore, it cost the researcher a total of £500 to recruit participants for the survey.

In addition to the cost, a significant amount of time was spent filtering both the organisations contacted and the individuals on the social networking site. The researcher had to ensure that up-to-date contact details were available for the organisations. Some of the emails and phone numbers for some of the organisations were outdated. Additionally, personalised emails had to be sent to the participants on LinkedIn to avoid the recipients ignoring the emails or dismissing it as junk emails.

Nonetheless, using a web-based survey was more appropriate for this study than postal surveys mainly because of the strict requirement of the target audience. Postal surveys would require sending out the questionnaires to the organisation, which may be more time consuming and the response rate seeing as it is a specific audience may be lower.

6.8 DATA ANALYSIS

This section discusses the data analysis techniques, the statistical tool utilised for the data analysis (SEM, AMOS) its fundamentals and capabilities, mainly, it follows from section 4.6 and appendix 2, which introduces SEM, providing definitions and discussions about the

various models, applications and symbols in SEM. Following the introduction of SEM in chapter 3, it should be stressed that the SEM was best suited for this study as it allows the study to measure latent variables such as the concept of trust. It also allows for multivariant comparison of variables and takes into consideration measurement errors that may have occurred during data collection.

This section discusses the process of screening, cleaning, and preparing the data, and ensuring it meets the minimum requirement for SEM analysis before commencing the analysis.

6.8.1 The Data Cleaning and Preparation Process

6.8.1.1 *Data Cleaning*

To ensure that the data collected can be used for further analysis, it is crucial to present the data in a format that is both useable and readable. In order to achieve this, a data preparation phase is essential. A codebook, where each response category of the questionnaire was assigned numerical values; designed during the questionnaire design phase was used to create a spreadsheet on IBM SPSS Statistics 25.0. An example of the response category and the numerical value allocated are shown in Figure 6.2
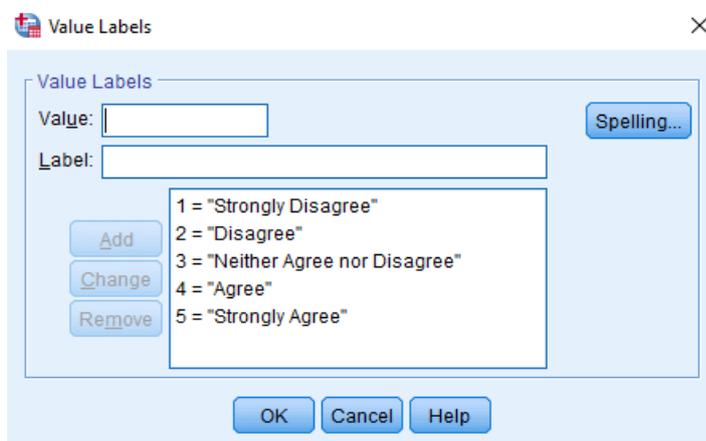
Figure 6.2: Example of Data Coding

Since IBM SPSS does not recognise Google Form spreadsheets, which the data was presented in; hence, to eliminate data entry error and to avoid introducing inconsistencies, the data was transferred to an excel format before being imported into the SPSS software. Additionally, each construct was abbreviated; for instance, the Alliance Function was shortened to All.Fun and each item of the questionnaire was assigned a case number based on their associated constructs,

e.g. All.Fun_1 (Table 6:2). This was done to allow easier manipulation and interpretation of the data. Subsequently, each respondent was assigned a case number, to allow easy identification of cases and ensure anonymity. Finally, the variables' types were manually selected, with most of the items being 'scale' as SPSS only offers three categories, nominal, ordinal and scale. The scale represents both ratio and interval scales; hence, it was selected to ensure the software handles the data appropriately.

The process described above, allowed the data to be entered into IBM SPSS, the statistical software utilised for preliminary analysis such as the descriptive data analysis as well as preparing the data for the subsequent SEM analysis using the AMOS software.

6.8.1.2 *Handling Missing Data and Non-Response Bias*

Once the data was inputted into SPSS, a check for missing data was conducted. From the first 392 responses received, it was observed that 10 cases had more than 20% incomplete responses and as such were deleted from the data. Upon further investigation, it was found that seven variables had less than 5% missing responses, which were replaced using the closest median (Table 6:4), in line with recommendations from Schmoler et al., (2010).

	Result Variables				
	Result Variable	N of Replaced Missing Values	Case Number of Non-Missing Values		N of Valid Cases	Creating Function
			First	Last		
1	Trust_2	1	1	380	380	MEDIAN (Trust_2, ALL)
2	Trust_3	1	1	380	380	MEDIAN (Trust_3, ALL)
3	Trust_5	1	1	380	380	MEDIAN (Trust_5, ALL)
4	Contract_6	1	1	380	380	MEDIAN (Contract_6, ALL)
5	UCP_1	1	1	380	380	MEDIAN (UCP_1, ALL)

Table 6:4: Handling missing data

After deleting incomplete responses and replacing missing values, there were 382 responses left to carry out the analysis, which is an adequate number for SEM analysis. These 382 responses were also 'range-checked' to ensure all missing data were addressed. It should be noted that there was no systematic pattern observed in the missing data cases.

6.8.1.3 *Checks for Outliers*

Outliers are values that exist outside its excepted normal range of possible scores in a dataset, which can affect the outcome of a statistic, e.g., its mean, correlation or standard deviation by either inflating or deflating the results (Kline, 2015). Some of the causes of outliers may arise

from errors in inputting data, misspecification of missing values, incorrect sample population. Hair et al., (2010), stresses the importance of addressing outliers prior to beginning analysis on the dataset to avoid Type I or Type II statistical errors. Additionally, Byrne (2016), recommends checking for outliers, especially when conducting SEM analysis, as extreme values in a dataset are in contradiction of the most significant SEM assumptions – the normality assumption.

Even though AMOS is capable of detecting and correcting outliers before commencing the primary analysis, there are other techniques for detecting outliers (Tabachnick and Fidell, 2014). For instance, graphical methods such as Q-Q plots or boxplots can be used to identify univariate outliers. Tabachnick and Fidell, (2014), adds that there is a potential for outliers to exist in univariate cases when the distribution of the z scores (i.e. standard deviation above and below the mean) is greater than 3.

Byrne, (2016), discusses two techniques of detecting multivariate outliers. In one method, cases which have the highest contribution to multivariate non-normality index (Mardia's 1970 index) can be identified by AMOS. The critical ratio value (C.R) in AMOS, represents the estimate of Mardia's normalised multivariant kurtosis, although, AMOS does not label it as Mardia's normalised estimates. The other technique involves computing the squared Mahalanobis distance (d2) in AMOS, which measures the distance between a set of scores for a case and the sample means of all variables in the dataset in standard deviation units. Tabachnick and Fidell (2014) recommend guidelines for using Mahalanobis distance, which is evaluated as Chi-Square with degrees of freedom consistent with the number of independent variables in the model.

Even though there are possibilities of outliers existing in any dataset, Tabachnick and Fidell (2014), observe that the chances of outliers being present in data obtained through a Likert scale are extremely low. Stating that it is not unusual for some responses to tend towards a specific category depending on the population and instrument distribution, for instance, most of the sample may select a particular response category 'strongly agree', with other responses not being potential outliers.

During the data preparation for this study, Mahalanobis distance was adopted to check for outliers. In order to achieve this, a Mahalanobis distance was requested using the total scores on the item of each construct; it was conducted as part of linear regression on SPSS.

The study found two outliers, which were subsequently removed. The low rate of outliers in the data set is not surprising as most of the responses were in a Likert scale format and were imported into SPSS; there was no response that significantly influences the rest of the data set. Having removed the outliers, there were no other indications of univariant and multivariant outliers in the dataset, and the remaining 380 cases were permissible for the analysis; although Pallant (2016) notes that outliers affect smaller sample sizes, typically less than 200 cases, which shows that the analysis would not be influenced by outliers.

6.8.1.4 *Measuring Data Normality*

Assessing normality of a data set involves obtaining information on the distribution of scores and then measuring its skewness and kurtosis. Although it can be assumed that the presence of skewness or kurtosis in a dataset may be problematic, Tabachnick & Fidell (2014) argue that it does not affect the analysis with large samples (i.e. >200 responses). They add that in large samples, no deviation from normality should be expected as positive kurtosis disappears when the sample is more than 100; similarly, negative kurtosis disappears in sample sizes above 200.

Additionally, there seems to be an uncertainty in the literature regarding the acceptable value of skewness and kurtosis, which can indicate a problematic data. While Field (2009), argues a distribution is normal and insignificant if the z-score value falls below 3.29 (p < .001), Kline (2015), maintains that normality is indicated by Skewness Index (SI) below 3 and Kurtosis Index (KI) of 10. Nevertheless, Kline (2015), suggests that a conservative absolute value for (SI < 3) and (KI < 20) is appropriate. Although, West et al., (1995), states that a kurtosis value above 7 may be problematic, as it suggests a departure from normality.

There are several techniques to examine the normality of data. Normality can be established through graphical means, for example, frequency distribution with histogram, Q-Q plots and P-P plots, box plots etc. Normality can also be assessed using the Kolmogorov-Smirnov test or Shapiro-Wilk test to compare sample scores of customarily distributed scores with the same mean and standard deviation, with a non-significant score indicating normality (Field, 2009; Tabachnick & Fidell, 2014).

This study establishes normality using skewness and kurtosis values using a conservative threshold of +/- 3 as discussed above on both the items and constructs (see appendix). There were no cases of skewness and kurtosis, except for a descriptive item regarding respondent's employment type, which was excepted all the sample population should be employed.

However, this does not affect the analysis as the item is purely a descriptive item and would not be included in the SEM analysis. Therefore, based on the indices obtained and the large sample size, there should be no significant influence on the SEM analysis.

The AMOS software can test for both univariate and multivariate normality. It should be noted that SEM analysis is asymptotic in nature, as such, the results obtained from model estimations are regarded as an approximation of the truth, particularly for studies with large sample size (Arbuckle, 2016).

To further proof the normality assumptions have not been violated in this study, visual representation to observe the normality was requested through a P-P plot available in (appendix).

6.8.1.5 *Multicollinearity*

In a statistical parametric analysis, the issue of multicollinearity and singularity are sources of potential problems. Multicollinearity occurs when there is a strong correlation between variables, while singularity occurs, a variable is a combination of more than two variables. According to Pallant (2016), when a correlation coefficient is > .90, it implies issues with multicollinearity. A multicollinearity diagnostic test can be conducted using SPSS to test the uniqueness of an independent variable (IV) and investigate whether there is an overlap in the dependent variable (DV).

The two estimates used to check for multicollinearity issues in a data set are Tolerance Value, which measures the variability of the IV not explained by the other constructs in the model, and Variance Inflation Factor which is the inverse of Tolerance Value (Pallant, 2016). A tolerance value < .1 suggests a multicollinearity issue, while a VIF > 10 denotes the existence of multicollinearity (Pallant, 2016).

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.429	.062		22.899	.000		
	Trust	.078	.046	.082	1.710	.088	.938	1.066
	Man.Ten	-.112	.024	-.232	-4.715	.000	.886	1.128
	All.Fun	-.030	.035	-.044	-.867	.386	.824	1.214
	Contract	.072	.028	.130	2.558	.011	.828	1.208
	SCF	-.150	.028	-.258	-5.360	.000	.924	1.082
a. Dependent Variable: **ICP**								
Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	

		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.861	.069		12.518	.000		
	Trust	.232	.050	.227	4.609	.000	.938	1.066
	Man.Ten	-.002	.026	-.005	-.089	.929	.886	1.128
	All.Fun	-.077	.039	-.104	-1.980	.048	.824	1.214
	Contract	.027	.031	.046	.871	.384	.828	1.208
	SCF	-.153	.031	-.246	-4.956	.000	.924	1.082
a. Dependent Variable: **UCP**								

Table 6:5: Multicollinearity Diagnostic

Since there are two DVs in this study, the outcome of unintended coopetition (UCP) and intended coopetition (ICP) two multicollinearity tests were conducted using SPSS (Table 6:5), and in line with the specifications discussed above, the coefficients of tolerance ($< .1$) and VIF (> 10) shows there are no concerns with multicollinearity. It should be noted that the characteristics of the variables in this study are presented in section 7.4.1, with the discussion of the measurement model.

6.9 RELIABILITY AND VALIDITY OF THE CONSTRUCT

Reliability and validity were discussed earlier in section 6.5 in relation to the measurement instrument adopted for the study. This section focuses on how the statistical procedures used to establish reliability and validity of the constructs in the proposed model.

6.9.1 Internal Reliability

Internal reliability is concerned with homogeneity of items in a scale, to show that these items are measuring the same construct. The most common method of measuring internal consistency or reliability of a construct in management study is Cronbach's Alpha (Pallant, 2016). However, some authors have questioned whether the Cronbach's Alpha can determine if an item is measuring a unidimensional construct (DeVellis, 2017; Sijtsma, 2009). These authors argue that Cronbach's Alpha does not provide the best estimate of reliability, as it relies on the number of items in a scale to present a value of lower that indicates the lower bound of the item's reliability. In other words, a high Cronbach Alpha value does not necessarily imply that a measure is unidimensional because the value is influenced by the number of items in a construct. Therefore, it is suggested that in addition to estimating the Cronbach Alpha, an Exploratory Factor Analysis (EFA) is conducted to ensure the internal reliability of measurement.

The primary purpose of an EFA is to group strongly correlated items in a dataset together and reduce the number of items used to measure a construct, which provides the opportunity to remove unnecessary items that can make the measurement of a construct ambiguous (Costello

and Osbourne 2005; Reio and Shuck, 2015). Basically, EFA examines the pairwise relationships between individual variables to group them by extracting latent factors from the measured variables. Costello and Osbourne (2005) argue that EFA is used to prepare a dataset for a cleaner SEM, and should precede an internal reliability test, to ensure that each construct is unidimensional.

In EFA, it is essential to ensure that there is no cross-loading, such that each item loads to a single factor and the loadings should be above .3 (Costello and Osbourne 2005). Additionally, the ideal Cronbach Alpha value, which shows the instruments and data is trustworthy should be greater or equal to .7 Lance et al., (2006).

Pattern Matrix							
	Factor						
	1	2	3	4	5	6	7
Cronbach Alpha	**.943**	**.939**	**.912**	**.901**	**.931**	**.816**	**.842**
All.Fun_1			.568				
All.Fun_2			.840				
All.Fun_3			.721				
All.Fun_4			.655				
All.Fun_5			.925				
All.Fun_6			.946				
All.Fun_7			.638				
Contract_1		.659					
Contract_2		.862					
Contract_3		.826					
Contract_4		.875					
Contract_5		.838					
Contract_6		.799					
Contract_7		.885					
ICP_1							.678
ICP_2							.725
ICP_3							.698
ICP_4							.587
Man.Ten_1					.747		
Man.Ten_2					.839		
Man.Ten_3					.928		
Man.Ten_4					.875		
Man.Ten_5					.881		
SCF_1						.733	
SCF_2						.760	
SCF_3						.724	
SCF_4						.676	
Trust_1	.803						
Trust_2	.816						
Trust_3	.944						

Trust_4	.961						
Trust_5	.859						
Trust_6	.725						
Trust_7	.654						
UCP_2				.853			
UCP_3				.945			
UCP_4				.777			
UCP_5				.743			
UCP_7				.534			
Extraction Method: Maximum Likelihood. Rotation Method: Promax with Kaiser Normalization.[a]							
a. Rotation converged in 7 iterations.							

Table 6:6: Pattern Matrix, with Cronbach's Alpha

Table 6:6 shows the pattern matrix for this study following an EFA using SPSS; it also indicates the Cronbach coefficient for each construct. The full Cronbach alpha table for each construct is presented in the appendix. Notable, two items (UCP 1 and 6) were removed, due to cross-loadings with ICP and loadings below .3 in the EFA.

Item Code	Measurement Item	Reason
UCP_1	We have engaged in unplanned collaboration in the past.	Cross-loading with Intended coopetition construct.
UCP_6	Our supply chain is reactive.	Cross-loading with Intended coopetition construct.

Table 6:7: Item removed after EFA

The similarity that exists between the unintended and intended coopetition constructs may be the reason behind the cross-loadings of these items. However, despite removing these items, the Cronbach Alpha coefficient is above the threshold ($\geq$.7) for all the constructs. No items were removed due to reliability concerns. Therefore, the Table 6:6 shows that the measures are both unidimensional and internal reliability.

6.9.2 Construct Validity

In addition to establishing the construct reliability, it is crucial to assess the validity of the constructs. The validity of a construct shows the degree to which items are interrelated (DeVellis, 2017; Kline, 2015). Construct validity allows a researcher to account for the effects of measurement errors and method variance before proceeding with the analysis (Byrne, 2016). Establishing the validity of a construct is vital in many statistical analyses, especially in SEM,

because of the presence of measurement errors, which can introduce bias in the outcome of the study.

Convergent validity and discriminant validity are the tests used to establish the validity of a construct. These tests are conducted by evaluating the measures of the same constructs against each other as opposed to any other external criterion. These tests compare the strengths and patterns of how measurement items are intercorrelated with each other, to establish the relationship across and within the constructs (Spector 1992). To establish discriminant and convergent validity, confirmatory factor analysis (CFA) is used to assess the factor loadings of all constructs in the measurement model. Additionally, construct validity, item validity, maximum shared variance (MSV) and average variance extracted (AVE) can be used to establish the validity of a construct (Kline, 2015; Hair et al., 2010).

Convergent validity shows the degree of interrelationship between various items measuring the same constructs, which can be assessed by a strong intercorrelation between the items in a measurement model. In order to establish convergent validity, the standardised factor loadings of items measuring the same construct are expected to be high (i.e. > .5) or at the least, higher than the cross-factor correlation (Kline, 2015; Spector, 1992). Also, the square root of the standardised factor loadings should ideally be greater than their corresponding factor loadings, and the AVE should be greater than .50 (MacKenzie et al., 2011). Additionally, the composite reliability (CR), provides another guideline to confirm the convergent validity of a model (Hair et al., 2010). CR is expected to have a value greater than .7 to show the reliability of the construct (Hair et al., 2010).

On the other hand, discriminant validity is measuring the extent to which different constructs are actually unrelated. Simply put, the correlation between items measuring different constructs is expected to be low, i.e. less than .50 (Kline, 2015). Similar to convergent validity, CFA is used to establish discriminant validity; however, the correlation between two constructs is expected to be less than .90, to show that the constructs are different (Kline, 2015).

	CR	AVE	MSV	MaxR(H)	ICP	Trust	Contract	All.Fun	UCP	Man.Ten	SCF
ICP	0.849	0.583	0.545	0.849	**0.764**						
Trust	0.942	0.699	0.349	0.949	0.591	**0.836**					
Contract	0.938	0.683	0.298	0.942	0.530	0.502	**0.827**				
All.Fun	0.910	0.594	0.298	0.918	0.428	0.369	0.546	**0.771**			
UCP	0.903	0.651	0.545	0.913	0.738	0.567	0.418	0.301	**0.807**		

Man.Ten	0.933	0.737	0.177	0.937	0.241	0.246	0.232	0.406	0.237	**0.859**	
SCF	0.816	0.526	0.177	0.817	0.296	0.318	0.311	0.404	0.188	0.421	**0.726**

Table 6:8: Construct Validity

Following a CFA on AMOS to establish the validity of the construct (Table 6:8), it can be observed that there is no convergent or discriminant validity issue in the constructs, given that the composite reliability (CR) coefficients are above .7, which is an additional proof of construct reliability, the AVE is also greater than .50 as expected (Hair et al., 2010). Moreover, the square roots of the AVE (the diagonals) is greater than the inter-construct correlation, showing that convergent validity. Additionally, the MSV is less than the AVE, which is suggestive of discriminant validity. Although, one item was removed (ICP_5) (*we are familiar with coopetition)* was removed as a result of a high correlation with UCP construct. Once the item was removed from the model, no validity issues were observed. Removing this item did not affect the reliability of the construct as the Cronbach Alpha was still above the threshold value (.842), and the number of items measuring ICP remained over 3 as expected.

6.10 ACCOUNTING FOR COMMON METHOD BIAS

Following the assessment of reliability and validity issues and the other parametric tests to ensure the dataset is fit for purpose, it is essential to check for common method bias (CMB) and its estimations which would be discussed further in this section.

CMB is sources of measurement error in research, particularly non-experimental studies, as the error arises from the method of measurement rather than from the constructs being measured (MacKenzie & Podsakoff, 2012). It was argued that the method of measurement, such as the measuring instrument, the context and content can influence the responses and as such is susceptible to common method variance (CMV) (Podsakoff et al., 2003).

While CMB measures the extent to which correlations are influenced as a result of common methods effect, CMV shows the variance in the observed scores (Spector, 2006). Not accounting for these errors can affect the conclusions of the research findings as the measurement method can modify the construct, or distort the measurement process without much effect on the construct. CMV is, therefore, thought to be caused by the measurement method as it can inflate or deflate the correlations between the constructs.

However, Spector (2006), argues that the effects of CMV on the validity of the study may be exaggerated, as its effect on validity may not be significant. Notwithstanding, Bryne (2016), adds that not accounting for CMB or properly addressing its effects can result in Type I or II errors.

Even though studies have identified approaches to address and check for CMB, it is not clear how to manage its effect (MacKenzie and Podsakoff, 2012). The procedures for assessing CMB stresses the need to first, identify its source and to take control measures from the design phase. Therefore, it is crucial to investigate the causes of CMB and some control measures in empirical studies. The sources of CMB has been classified into four broad groups, namely: common source or rater effects, common item characteristics effects, common item context effects, and common measurement context effects (Podsakoff et al., 2012).

Common source or rater effect arises when responses for predictor and criterion variables are acquired from the same source, which can result in artifactual covariance between variables. The rater effect can occur due to social desirability, mood, consistency motif, rating leniency etc. In order to eliminate these effects, the predictor and criterion variables can be acquired from various sources, although sourcing responses for each variable from various sources may be difficult and expensive to achieve. Hence, it is crucial to consider these effects at the instrument design phase, particularly how and when the instruments are administered to reduce the common source effect. Since this study used the same source to obtain both the criterion and predictive variable, there is a chance that CMB would be present in the research.

CMB caused by common item characteristics arises as a result of the manner in which items are presented, which may cause artifactual covariance. For instance, the way a question is phrased can create ambiguity or complexity and even lead to the influence of social desirability. Additionally, the measuring scale format can lead to item related bias. Similarly, common item context effects relating to preparing, embeddedness and contextual induced mood of the measuring instrument can introduce CMB. In order to reduce these effects in this study, most of the questions used in the instrument were adapted from previously published articles, and the questions, as well as the scale, was also piloted.

The common measurement context effects can arise when items are measured at the same time, in the same location, through the same medium. This is because they are influenced by the prevailing context, which is independent of the construct under study. To overcome this effect, the instruments can be administered at different times, location or through various means.

However, this is not possible in this study, and the questionnaires were distributed using the web-based methods.

As described above, to reduce the influences of these effects on the study, steps were taken at the design phase by piloting the study, adapting tested question items, avoiding the use of double-barrel questions and technical jargons which could result in ambiguity, questions that are subject to the respondent's subjective interpretation were also removed. Notwithstanding, a check was conducted to access the effects of CMB, considering the likelihood of CMB since the study uses the same instrument in the same context to measure both criterion and predictive variables.

Consequently, Podsakoff et al., (2003), describes several approaches to account for CMB and they include; Harman's single factor test, partial correlation procedure, controlling for the effects of a directly measured latent methods factor, controlling for the effects of an unmeasured latent methods factor, multiple method factor, correlated uniqueness model, and direct product model. To select the most appropriate method to account for CMB, this study reviewed the advantages, and disadvantages of the methods highlighted Podsakoff et al., (2003), considered the context of the research especially the process of administering the questionnaires. Moreover, the decision about the CMB was made, in line with Podsakoff et al. (2003)'s assumption that CMB control measures would influence the item level instead of the construct level.

This study adopts controlling for the effects of an unmeasured latent method factor to account for CMB, which involves adding a first-order common latent factor (CLF) with all the measures as indicators in the model. This method was chosen as it offers the opportunity to model the effects of CMB on the observed variable instead of the latent variables in the theoretical model. Additionally, it allows each indicator load on their respective latent factor and the common latent factor. This implies that the indicators in the measurement model, measured both the latent construct and the added CLF to identify variances.

Since there was no requirement to identify a specific factor responsible for CMB in the model, a CLF was created to identify the common variance in the model's observed variables. This method was considered to be appropriate because the study adopted a reflective measurement model such that the constructs were predictors of the indicators. Hence, the test was conducted using a full measurement model (without CLF) (Figure 6.3) and a CLF model (Figure 6.4), using only reliable items. Table 6:9 shows the model fit for both models.
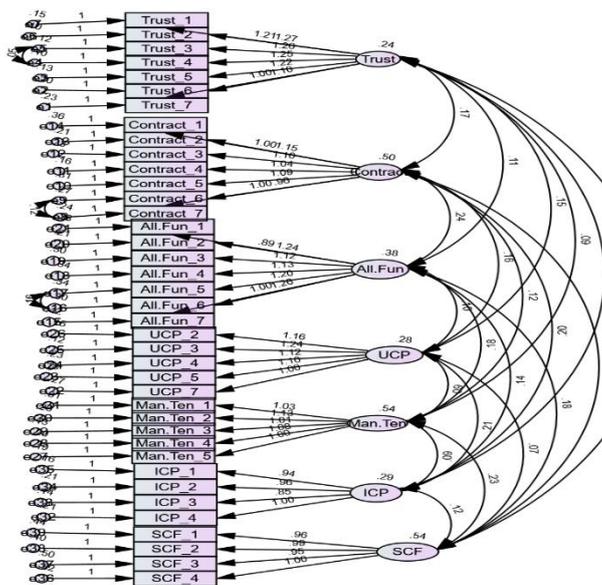
Figure 6.3: Measurement Model without CLF
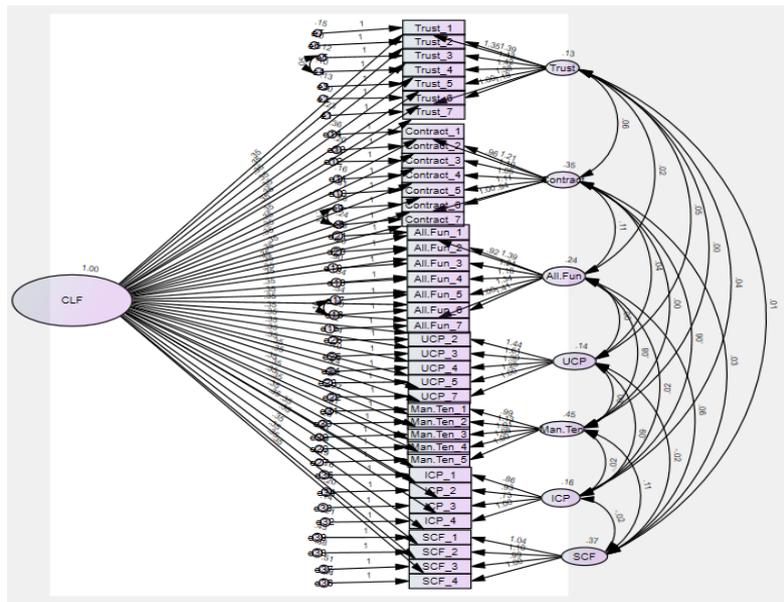
Figure 6.4: CLF Model

	Without CLF	**With CLF**
CMIN/DF	1.726	1.701
DF	678	677
SRMR		
GFI	.866	.867
CFI	.956	.957

NFI	.902	.903
TLI	.952	.953
RMSEA	.044	.043
PCLOSE	.993	.997
P	.000	.000

Table 6:9 Model Fit for CLF and Full Measurement Models

To check whether all the shared variance with all the indicators are significantly different to zero, the Chi-Square of the CLF model represented by CMIN/DF is 1.701, and the measurement model has a Chi-Square of 1.726 were compared. The difference between the two models is 0.025, which is not significant, which therefore implies no common method bias. Bryne, (2016), posits that a large difference in the chi-square (> .20) or a significant difference in CFI values, shows there is a lack of discriminant validity and as such suggests the presence of CMB. Therefore, it can be observed that there are no validity issues (discriminant and convergent) or a presence of CMB in this study.

6.11 CHAPTER SUMMARY

This chapter discusses the data collection process for quantitative data. It discusses the sampling technique, survey instruments, sampling design and population, the sampling frame and the implementation of the survey. The study adopts a web-based approach to data collection; it also describes the challenges faced while collecting the data. Additionally, this chapter presents the approach used to ensure that the data is cleaned and error-free, in line with the minimum requirement for SEM analysis. The chapter also describes how the validity and reliability of the data were established, while accounting for common method bias. The section provides an overview of the SEM analysis and its fundamental principles. The next section provides a description and analysis of the results obtained from the quantitative study, analysed using structural equation modelling.

Chapter 7: RESULTS
7.1 CHAPTER INTRODUCTION

This chapter presents the data analysis of the quantitative data collected using an online survey. It should be noted that the qualitative data was analysed in (Section 5.3), and the outcome of the analysis was utilised in designing the conceptual framework and the survey questions. The preliminary steps conducted to ensure that the data is fit for use was discussed in the previous section (6.8). These steps include data cleaning, checking for missing data, assessing data normality, assessing the reliability and the validity of the data etc. The importance of conducting the preliminary checks is to ensure that the quality and reliability of the data before conducting the analysis. This chapter, therefore, presents a descriptive analysis of the respondents using IBM SPSS. The descriptive analysis presents an overview of the characteristics of the respondents, which gives a background frame for the study to improve the overall understanding of the research outcome. The descriptive analysis was conducted using the cleaned data (i.e. without missing data), to ensure that only respondents that fit the expected criteria were utilised for the study. Following the descriptive analysis, the structural equation analysis was conducted, which included the confirmatory factor analysis, model evaluation, hypothesis testing and conclusion.

7.2 DESCRIPTIVE STATISTICS

This section shows the descriptive analysis of the data collected; it profiles the respondents and seeks to uncover relationships between some of the variables. For improved visual aid, the free website (visme.co) was used to provide an attractive visual representation of the data.

7.2.1 Respondent's Profile
This section presents the profile of the respondents, which includes the years and extent of involvement with SC, the management level, the size of the respondent's organisation, their educational background etc. This profiling is essential to give insight to the respondent's sample group. The profiling is summarised in the following Table 7:1, (see appendix for the frequency distribution table).

	Category	Statistics

1	Work Experience	
2	Management Level	
3	Extent of Respondents'	

	Involvement in SC Role	**Involvement in IOR** What is the extent of your involvement in IORs in your organisation Small 7.1%, Moderate 20.0%, Some 24.5%, Large 48.4%
4	Respondents' Educational Background	**Educational Background** Secondary 6.1%, College 31.8%, UG 39.2%, PG 22.9% UG = Undergraduate, PG = Postgraduate
5	Type of Employment	
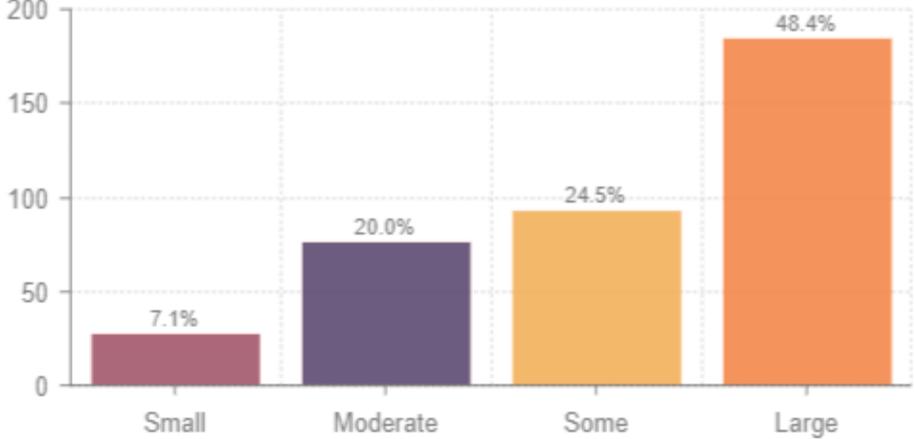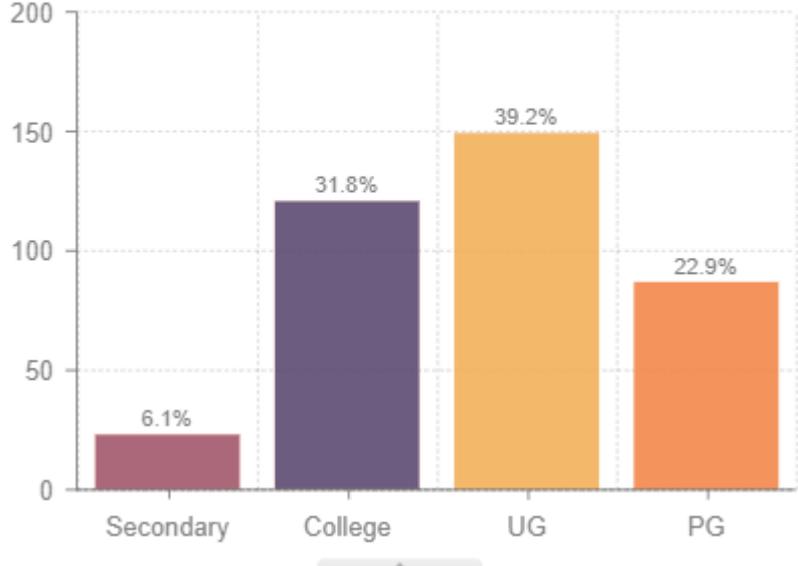
Type of Employment

Self-Emp = Self Employed, F-Emp = Employed Full Time, P-Emp = Employed Part Time, Volunteer = Volunteer.

6	Size of Organisation

Size of Organisation

Micro = $\leq$ 10 employees, Small = 11 – 49 employees, Medium = 50 – 249, Large = $\geq$ 250, MNE = > 1 countries.

Table 7:1: Respondent's Profiling

Item 1 of the respondents' profiling in Table 7:1 shows the demographic breakdown of the respondents with respect to their years of work experience within the OGI. Although the majority of the work experience falls within the 1 – 15 years accounting for 78.2% of the respondents, it is still adequate for the study especially since most of the respondents fall within the 10-15 years of work experience (34.2%). Therefore, it can be implied that most of the

respondents have the basic ideas of business functions and operations within the industry. Bogner et al., (2009) argue that there are no set criteria for determining expertise, however, suggesting that length of career can be used to judge expertise. Since most of the respondents have about 15 years of work experience, they can be considered experts industry experts. However, the specific job role of the respondents within the industry is unknown, especially since the UK OGI is relatively large and comprises of several functions, e.g. Administrative or mining roles. However, since most of the respondents have more than 15 years of experience in the industry, this study assumes that the respondents would have interacted with other external organisations. In order to ensure that the respondents have interacted at some level with external organisations, their management position within their organisation was assessed.

The management level of respondents (item 2), shows that only 6.3% of the respondents are not employed within the management role of an OGI, implying that this number of people may not be involved or able to influence strategic decisions in their organisations. It, therefore, shows that 93.7% of the respondents have the capacity to at the least influence strategic decisions in their organisations. This data assumes that because the respondents are involved mainly in the management of their organisations, they would have interacted at some points with other external organisations. The data also shows that the respondents would understand the terms used in the questionnaire and be able to relate to the elements necessary for inter-organisational interactions.

The management level and years of work experience do not explicitly prove that the respondents have been engaged in IO interactions. Therefore, this study measures the extent of respondent involvement in IORs (item 3). The data shows that the respondents have varying degrees of interaction with other external organisations. It should be stressed that this question served as screening questions, as respondents that did not have any IOR experience were removed from the study. The data shows that 7.1% of respondents have little interactions with external organisations and 92.9% are mostly involved in IORs in their organisations, of which 48.4% are largely involved in the function. This dataset shows that the correct audience were targeted for the study which centres around understanding the IO dynamics in the OGI. The data proves that the respondents would be familiar with the terms and the dynamics of IORs, showing their responses would be valuable for this study.

Majority of the respondents have either a college or undergraduate degree, with both educational qualifications accounting for 71% of the respondents as can be observed from item four in Table 7:1 above. It should be noted that a fifth option (primary level) was included in the survey and accounted for 0% of the respondents. The lack of respondents without a primary level of education may result from the sampling method, which targeted specific professionals. While a degree is not a necessary requirement to become an OG professional, as training and other non-degree courses can be offered to ensure suitability for the role; most professionals, especially in management roles, need to continually update their knowledge of the job role, as there is continuous improvement of the best practices within the field. This may explain why none of the respondents had a primary level of education, and the majority have an advanced degree. The chart shows that all the respondents have the cognitive capacity to understand and adequately respond to the questionnaire.

The type of respondents' employment, as shown in item 5 of Table 7:1, shows those employed full-time (60%) are over-represented in the survey. This is not surprising as ONS (2019), reports that 588,000 are full time within the business and support role of organisations, in contrast to the 75,000 employed within the part-time capacity of the same function. Hence, the rate of respondents in full-time and part-time employment of this study is consistent with the national statistics. It is not clear from the data, the capacity the respondents under the volunteer category are involved in the organisation, and how these involvements or lack of may affect their interactions with other organisations. However, since the volunteers make up 3.2% of the respondents, and there is a 92.9% rate of IO involvement (item 3), these group of respondents are not expected to affect the outcome of the study. It should be noted that this item on the questionnaire served as another cut-off question, as respondents who selected unemployed were not allowed to proceed with the survey since the study is interested in individuals who are actively employed within an OGC.
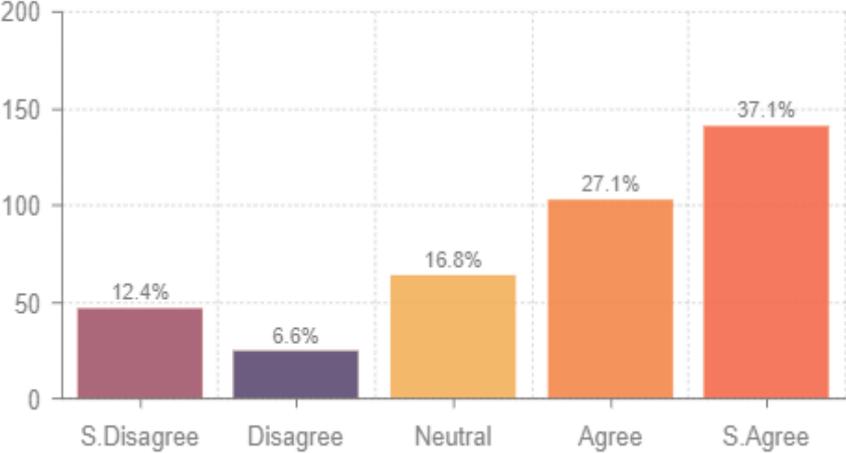
Finally, the criteria used for classification of the organisation size are: Micro represents organisations with less than 10 employees, small are organisations with 10-49 employees, medium represents 50-249, large for organisations with more than 250 employees, while MNE is for organisations in more than one country.
From item 6 of Table 7:1, it can be observed that most of the respondents are employed in either a large or MNE sized organisation, accounting for 76.1%. This is not surprising as most of the OGI organisations in the UK are located in more than one country, with some having

their head office in other nations. Since these respondents work in large organisations, it can be implied that they would be engaged in some form of IORs.

7.3 ASSESSING RESPONDENTS' AWARENESS OF COOPETITION

In order to examine the respondents' awareness of coopetition, it was essential to test the newness of the term by probing the respondents' familiarity with the term coopetition. In addition, it was vital to examine the respondents' knowledge of the coopetition concept. Put simply, this section of the study seeks to understand the degree to which collaboration among competitors occurs within an organisation, and if the respondents are aware of the term to describe the relationship. This analysis is vital as it can provide a backdrop to the rate of intended and unintended coopetition in industry, by assessing the rate at which competitors collaborate and the familiarity of the organisations to the strategy.

No	Category	Statistics
1.	Familiarity with the term	**Familiarity with Term** I have heard of the term coopetition — S.Disagree 12.4%, Disagree 6.6%, Neutral 16.8%, Agree 27.1%, S.Agree 37.1%
2.	Respondents' Involvement with Coopetition	

		Involvement with Coopetition How often do you work with competitors on a project Never 6.6%, Almost Never 11.8%, Sometimes 37.1%, Almost Always 26.1%, Always 18.4%
3.	Likelihood of Coopetition in the industry	**Likelihood of Coopetition in the Industry** Very Unlikely 1.6%, Unlikely 10.5%, Not Sure 16.1%, Likely 43.2%, Very Likely 28.7%

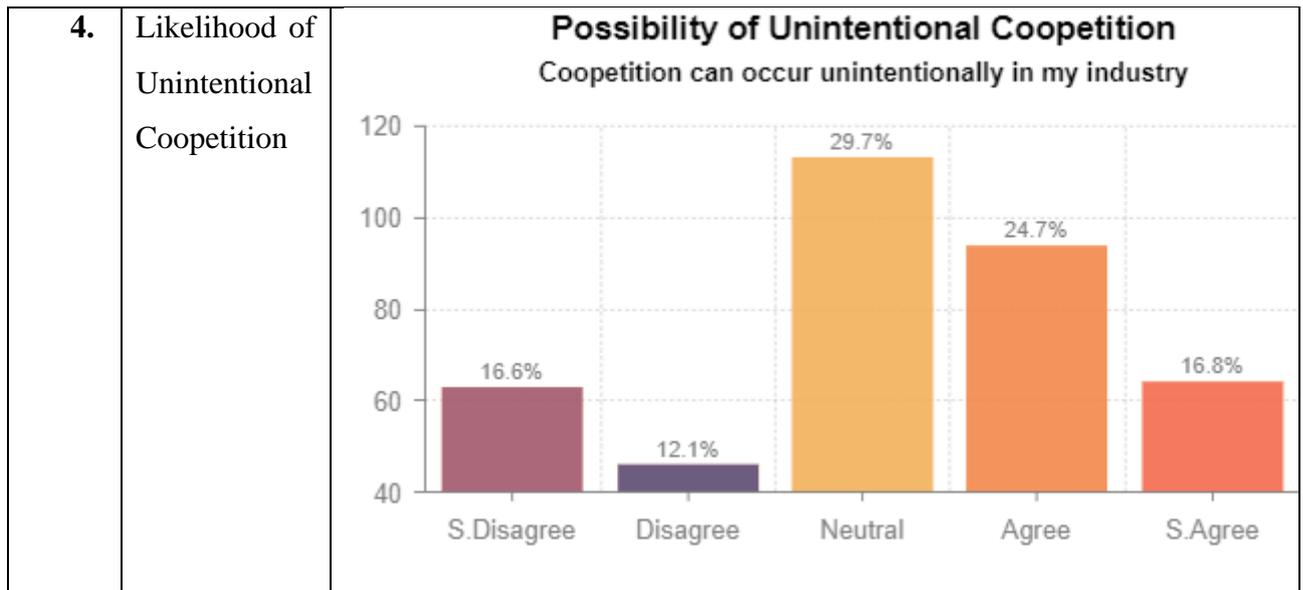| 4.	Likelihood of Unintentional Coopetition	

Table 7:2: Awareness of Coopetition

To ascertain how recognised the term coopetition is within the industry, respondents were asked if they had come across the coopetition term during their job role. As evident in item 1 of Table 7:2, 19% of the respondents had never come across the word. In addition to this, 19 %, 16.8% of the respondents, claimed to be neutral regarding their familiarity with the term. However, since there is no middle ground about the knowledge of a word, the study assumes that the respondents in the neutral category are not familiar with the coopetition term; therefore implying that 64.2% of the participants have come across the coopetition term.

This figure contradicts the stance provided in the review of literature and concept clarification interviews and the qualitative interviews that the term is unique and may not be popular within the OGI. Although, it is likely that bias may have been introduced in the survey as a brief description of coopetition was provided in the letters of introduction and invitation to participate in the study as well as at the beginning of the questionnaire, to give the potential participants a background of the subject matter. Hence, it is likely that the description of the term introduced a bias and participants who may not have been familiar with the term but familiar with the concept would claim to have prior knowledge of the word. Therefore, other follow up questions were asked to assess the respondents' understanding and applicability of the concept.

The second item in Table 7:2, shows that the amount of respondents involved in coopetition is higher than those who have little involvement with coopetition. The question 'in the past how often have you had to work with a competitor' seeks to understand the level and frequency of

respondents' involvement with coopetition. The highest category of respondents falls with the 'sometimes' group with 37.1% which suggests that the respondents are engaged in the coopetition concepts often, especially since the next category of respondents accounting for 26.1% of the respondents claim to be involved in coopetition "almost always". Only 18.4% of the respondents have limited involvement with the coopetition concept, where 6.6% have never had to work closely with their competitors.

Therefore, it can be implied that majority of the respondents, 81.6% have had experiences with coopetition, suggesting that they would have an adequate understanding of terms and reasoning in the rest of the questionnaire. It is, however, essential to note that, the capacity and extent to which the respondents were involved in a coopetitive relationship is not clear from the data gathered.

This data also proves because of the nature of the OGI, there would be an increased chance of unintentional coopetition in the industry, especially considering that only 64.2% (item 1) of respondents are familiar with the coopetition term and 81.6% (item 2) actually engage in coopetition practices. This may suggest that the likelihood of unintentional coopetition may be about 17.4%. This stance is also bolstered by item 4 on Table 7:2, where respondents who agree that coopetition can occur unintentionally account for 41.5% of the participants. Although these figures do not represent the rate of unintentional coopetition in the industry, which is outside the scope of this study, it proves that there is unintentional coopetition that exists within the industry.

In addition to item 2, item 3 of Table 7:2, shows that the OGI are open to coopetition within the industry, with 71.9% of the respondents affirming that the collaboration among competitors is not uncommon in the industry. While the nature or the extent of the coopetitive relationship cannot be determined from the data, there is evidence, which is contrary to the data obtained from the qualitative study regarding the willingness of organisations in the industry to engage in collaborative practices with their competitors.

7.4 STRUCTURAL EQUATION ANALYSIS OF RESULTS

This section presents the results of the analysis performed on the data using SEM AMOS and SPSS, to test the previously defined hypothesis and the extent to which the data describes the hypothesised model. This section is concerned with testing the hypothesis since the data has

been tested in the previous chapter for normality, validity, reliability, CMB and multicollinearity. Although some items were removed from the analysis with appropriate justification, no constructs were dropped.

7.4.1 The Measurement Model

When conducting an SEM analysis, the first step is to assess the measurement model, to ensure that it meets the required fit indices as discussed in the previous chapter and is suitable for the estimation in the structural model. According to Smith (2009), the structural model should be fit only after the measurement model has been estimated and accepted.

Additionally, Kline (2015) describes the measurement model as a confirmatory factor analysis (CFA), whose aim is to rigorously test for convergent and discriminant validity as well as assess the reliability of the observed variables. The measurement model also allows the researcher to conduct an initial review of the extent of the interrelationship among the latent variables.

In this study, the measurement model which is shown in (Figure 6.3) and reproduced in (Figure 7.1), adopts a reflective measurement model to show the relationships between the indicators and their latent variables. The measurement model contains all the latent variables used in the study, with the assumption that they share some degree of variance in the covariance matrix, since they are measured within the same framework. Schreiber (2008), adds that the covariance assumption in SEM is crucial since it provides the opportunity to assess the measurement model for admissibility and likely false correlation effects such as auto-correlation or multicollinearity relationships.

Unless expected, the presence of a low correlation in a measurement model may indicate some issues with the model and may cause the model to be rejected. Moreover, the covariance matrix allows a statistical control of common method bias in the model and provides evidence of interrelationship between the variables measured in the study. It is important to note that the measurement covariance does not represent a direct theory in the research; instead, it is an assumption; since the structural model is parsimonious and assumes fewer regressions than is implied by the covariance of the measurement model.

The measurement model also shows all the indicators in the model, along with their associated error terms. All the error loadings are constrained to 1, which indicates that each error term loads perfectly to its indicator. It should also be noted that some error terms are allowed to

covary in a measurement model based on the SEM modification indices. In fact, Kline (2015) argues that error terms for measures of a single variable are expected to share some degree of covariance. Kline (2015), adds that unmodeled covariance between the error variances can result in poor model fit, as the error variance of an indicator variable consists of random error and other unmeasured influences. There would be a correlation in the error variances when the unmeasured influence affects a different observed variable. Table 7:3 shows the variables contained in the measurement model, while Figure 7.1 presents the final solution of the measurement model with the estimates and error terms.

Variable Name	Variable Code	Description	No of Measurement Item
Transactional Governance	Contracts	Endogenous, independent variables	7
Relational Governance	Trusts	Endogenous, independent variables	7
Tension Management	Man.Ten	Exogenous, independent variable	5
Alliance Function	All.Fun	An exogenous, independent variable	7
Supply Chain Flexibility	SCF	An exogenous, independent variable	4
Intentional Coopetition	ICP	Endogenous Variable, Dependent Variable	4
Unintentional Coopetition	UCP	Endogenous Variables, Dependent Variable	5

Table 7:3: Characteristics of Model Variables in Measurement Model
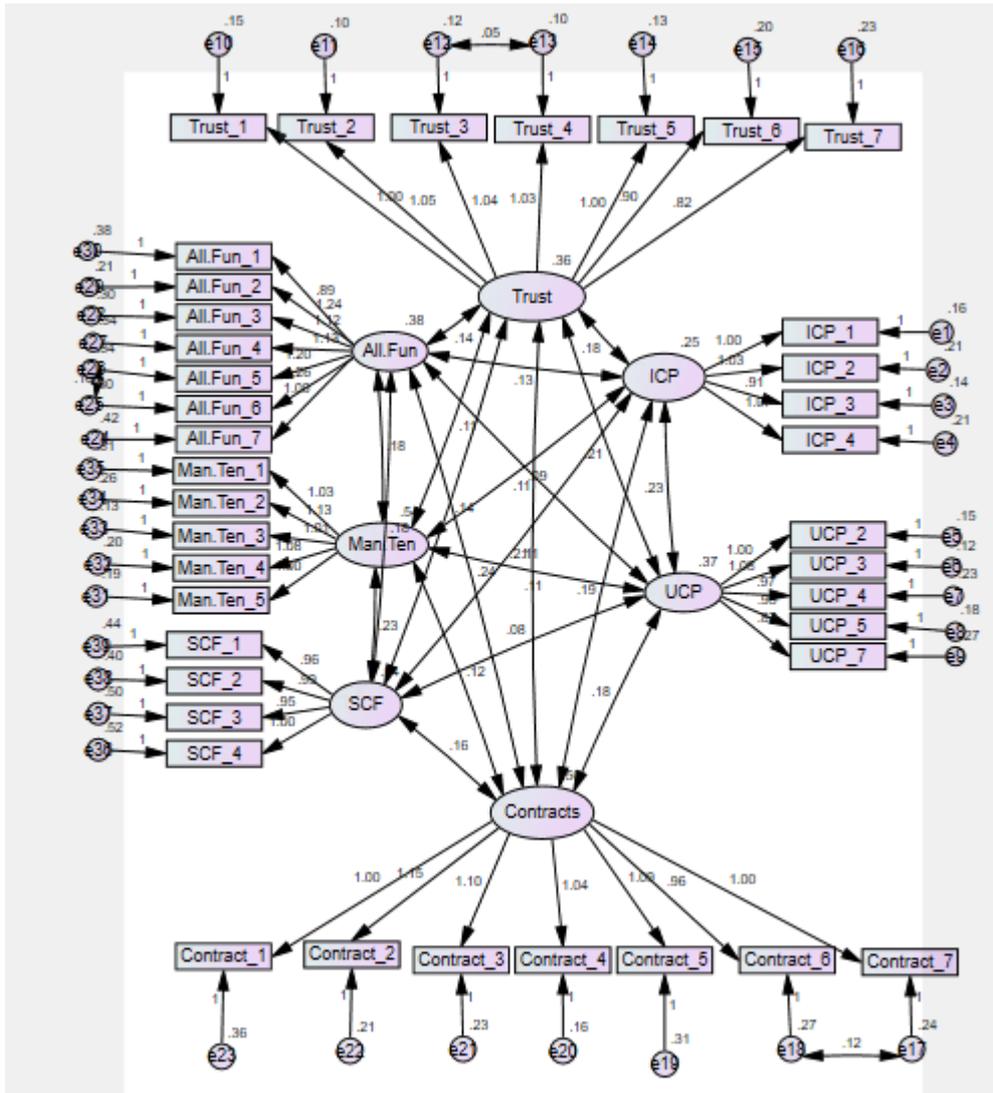
Figure 7.1: Measurement Model

Table 7:4 presents the reproduced estimations for ease of comprehension. As explained, each group of indicators contains one referent indicator item that is used to constrain the model identification. From the measurement model (Figure 7.1) and Table 7:4, the parameter estimates reveal the loadings of each item on the latent variables.

It can be observed that all items showed a strong loading on their latent variables, with the lowest loading of .668, significantly above the .4, threshold recommended by (Arbuckle, 2016). This implies that all the factors retained for the model fit well with their underlying latent variable. Additionally, Table 7:4, shows that the error estimates (S.E) and the critical ratios (C.R), for each variable in the model is within the expected estimates.

	Standardised Estimates	Estimate	S.E.	C.R.	P
ICP_1 <--- ICP	.780	1.000			
ICP_2 <--- ICP	.749	1.026	.070	14.699	***
ICP_3 <--- ICP	.769	.910	.060	15.122	***
ICP_4 <--- ICP	.757	1.067	.072	14.868	***
UCP_2 <--- UCP	.841	1.000			
UCP_3 <--- UCP	.888	1.077	.050	21.715	***
UCP_4 <--- UCP	.773	.967	.055	17.598	***
UCP_5 <--- UCP	.809	.950	.050	18.813	***
UCP_7 <--- UCP	.713	.865	.055	15.683	***
Trust_1 <--- Trust	.842	1.000			
Trust_2 <--- Trust	.892	1.046	.046	22.778	***
Trust_3 <--- Trust	.873	1.037	.047	21.851	***
Trust_4 <--- Trust	.890	1.030	.045	22.657	***
Trust_5 <--- Trust	.852	1.003	.048	21.063	***
Trust_6 <--- Trust	.773	.905	.050	18.025	***
Trust_7 <--- Trust	.715	.824	.051	16.070	***
Contract_7 <--- Contracts	.820	1.000			
Contract_6 <--- Contracts	.790	.957	.039	24.844	***
Contract_5 <--- Contracts	.809	1.093	.059	18.526	***
Contract_4 <--- Contracts	.879	1.037	.049	21.026	***
Contract_3 <--- Contracts	.849	1.096	.055	19.928	***
Contract_2 <--- Contracts	.873	1.151	.055	20.771	***
Contract_1 <--- Contracts	.760	.999	.059	16.940	***
All.Fun_7 <--- All.Fun	.691	1.000			
All.Fun_6 <--- All.Fun	.816	1.255	.086	14.527	***
All.Fun_5 <--- All.Fun	.788	1.201	.085	14.050	***
All.Fun_4 <--- All.Fun	.769	1.134	.082	13.789	***
All.Fun_3 <--- All.Fun	.782	1.116	.080	14.001	***
All.Fun_2 <--- All.Fun	.862	1.242	.081	15.254	***
All.Fun_1 <--- All.Fun	.668	.894	.074	12.084	***

Man.Ten_5 <--- Man.Ten	.862	1.000			
Man.Ten_4 <--- Man.Ten	.872	1.081	.048	22.731	***
Man.Ten_3 <--- Man.Ten	.901	1.009	.042	24.190	***
Man.Ten_2 <--- Man.Ten	.849	1.128	.052	21.672	***
Man.Ten_1 <--- Man.Ten	.807	1.029	.052	19.815	***
SCF_4 <--- SCF	.715	1.000			
SCF_3 <--- SCF	.702	.947	.080	11.883	***
SCF_2 <--- SCF	.754	.987	.079	12.564	***
SCF_1 <--- SCF	.730	.961	.078	12.266	***

Table 7:4: Measurement Model's Standardised Factor Loadings

In addition to the factor loading presented in Table 7:4 above, the variance structure of all item in the model, including the variables and the indicators and their error terms should also be evaluated. The estimates are shown in Table 7:5 below and confirms that all the estimated variances in the model are significant, which indicates all items in the model have an adequate internal variance to enable variable behaviours to be compared.

	Estimate	S.E.	C.R.	P
ICP	.251	.029	8.601	***
UCP	.372	.038	9.899	***
Trust	.356	.035	10.027	***
Contracts	.497	.052	9.602	***
All.Fun	.384	.052	7.443	***
Man.Ten	.538	.052	10.386	***
SCF	.542	.074	7.349	***
e1	.162	.015	10.691	***
e2	.207	.018	11.238	***
e3	.144	.013	10.904	***
e4	.213	.019	11.111	***
e5	.154	.014	10.807	***
e6	.116	.013	9.218	***
e7	.234	.020	11.969	***

e8	.177	.015	11.470	***
e9	.269	.021	12.524	***
e10	.146	.012	11.747	***
e11	.100	.010	10.518	***
e12	.120	.011	10.851	***
e13	.099	.009	10.408	***
e14	.135	.012	11.562	***
e15	.196	.016	12.544	***
e16	.232	.018	12.911	***
e17	.242	.020	11.880	***
e18	.274	.022	12.205	***
e19	.314	.026	12.083	***
e20	.157	.015	10.708	***
e21	.231	.020	11.453	***
e22	.207	.019	10.909	***
e23	.363	.029	12.557	***
e24	.419	.033	12.577	***
e25	.303	.027	11.027	***
e26	.338	.030	11.447	***
e27	.341	.029	11.870	***
e28	.303	.026	11.701	***
e29	.205	.021	9.958	***
e30	.381	.030	12.723	***
e31	.186	.017	11.062	***
e32	.198	.018	10.795	***
e33	.126	.013	9.695	***
e34	.264	.023	11.350	***
e35	.305	.025	12.040	***
e36	.517	.048	10.677	***
e37	.500	.046	10.907	***
e38	.400	.041	9.868	***

e39	.438	.042	10.396	***

Table 7:5: Item Variance

As discussed in the section above, it is crucial to access the measurement model's overall fit in relation to the common fit indices (*Table 0:5*). Even though the aim of the measurement model is not to access model fit, evaluating the model fit at this stage helps provide an indication of the fitness of the structural model.

It should be noted that in AMOS output, the model fit indices are usually reported in three variations; which are; the default model, the saturated model and the independent model. The default model represents the hypothesised model; the saturated model represents a variation where all the possible paths of the model are estimated and the independence model which assumes that all the likely paths in the model have a coefficient of zero. The fit indices of the model are shown in Table 7:6 below.

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	102	1170.270	678	.000	1.726
Saturated model	780	.000	0		
Independence model	39	11895.176	741	.000	16.053

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.027	.866	.846	.753
Saturated model	.000	1.000		
Independence model	.235	.175	.132	.166

Baseline Comparison

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.902	.892	.956	.952	.956
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.044	.040	.048	.993
Independence model	.199	.196	.202	.000

Table 7:6: Model's Fit Indices.

```
Standardized RMR

Default model
    Standardized RMR = .0396
```

Figure 7.2: Model Standardised RMR

The fit indices table above (Table 7:6), compared with the expected threshold discussed in (*Table 0:5*), shows a good model fit. For example, the CMIN/DF is 1.726, which is below the cut-off criteria of ≤ 2; the RMR of the model is 0.027, which is also below the cut-off criteria of ≤ 0.08. Another essential model fit index is the SRMR, which is .0396 (Figure 7.2), which falls under the required ≤ 0.08 cut of criteria. These outputs, therefore, suggest that the model is enough for structural analysis.

7.5 THE STRUCTURAL MODEL

After assessing the measurement model in SEM, the next logical step is to review the structural model. The structural model, as represented in Figure 7.3, below estimates the relationships between variables in a model. This phase of SEM is perhaps the most relevant, as it encompasses the model fitting, the estimation process and presents the structural hypothesis of the study for testing. The hypothesised model is formed from the outcome of both the review of the literature (chapter 2 and 3) and the qualitative analysis (chapter 4) of the study. Based on the review of the literature and the qualitative analysis, some hypothesis was developed, which are represented in the model as paths (regression paths). It is important to note that this model is not a causal model, instead shows the nature of the relationships between the latent variables.

Another essential characteristic of a structural model is the additional disturbance term. In SEM, each endogenous variable is given an additional disturbance term, which is similar to the

error terms in the standard regression. The disturbance term estimates the variance in the variable attributed to unknown random factors.

In most structural models, it is assumed that there is no correlation between the disturbance terms, implying that no two endogenous variables can share a commonly omitted factor. The presumption, known as the local independence assumption, suggests that the observed correlation among the endogenous variables can be explained by other measured variables in the model. However, Kenny (2008) observed that this assumption is restrictive and unrealistic, particularly when attempting to understand behavioural patterns. Thus, suggesting that disturbance terms can be correlated, when it the underlying endogenous variable share a minimum of one omitted cause. Kenny (2008), notes, however, that covarying the disturbance term should not be considered a routine, as it complicates the model, and result in biased estimates. Additionally, Kline (2015), suggests that a substantial justification, such as the similarities between the variables is required for the covarying the disturbance terms. Therefore, this study assumes that the UCP and ICP, share a similar omitted factor since the variables are highly identical, mainly since the coopetition factor, whether intended or unintended occurs. Another reason for covarying the disturbance terms in for these constructs was the high standardised residuals covariance (SRC) between the constructs. Similarly, the disturbance term between the constructs 'Trust' and 'Contracts' was also covaried as a result of the high SRC loadings between the constructs. For example, some of the SRC magnitudes between 'Trust' and 'Contracts' was as high as 4.728, which is high compared expected SRC threshold of (< 2.58) (Joreskog and Sorbom, 1979).

It should be noted that assessing the SRC of a model is an additional means of establishing the fitness of a model, as it shows any discrepancies between the hypothesised model (restricted covariance matrix) and the actual observations (sample covariance matrix), which allows the researcher identify areas of misfit in the model (Byrne, 2010). The SRC should, therefore, be examined in the model output, for magnitude greater than 2.58 (Joreskog and Sorbom, 1979) to establish the sample data accurately represents the hypothesised model. While there are currently no rules regarding the number of residuals above the expected value in a model, Schreiber (2008), observed that as the number of large residuals increases in a model, there is a deterioration in the model's explanatory power.

Thus, upon examining the SRC for this model (see appendix), only one residual covariance; for UCP_7 <-> Contract_6 was found to be over the recommended value. As a result, it can be

concluded that the sample data fit the hypothesised model, and as such, the model strongly underpins and represents the theories.
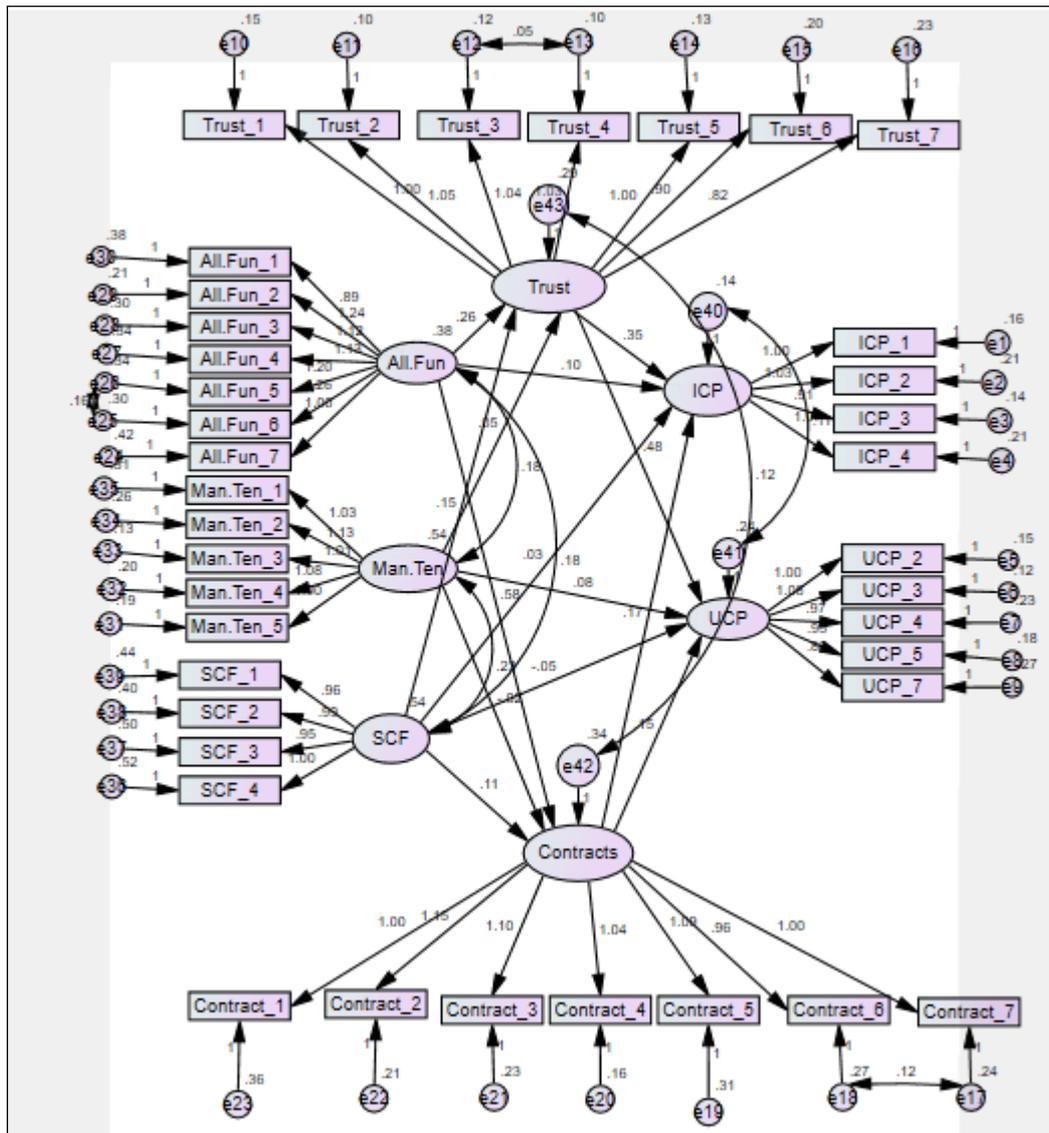

Figure 7.3: The Structural Model

The structural model was first assessed to establish the overall model fit. This step was followed by an individual assessment of the path estimates both direct and indirect, to help in either confirming or rejecting the hypothesis. These results are discussed in subsequent sections.

7.5.1 Global Model Fit

As mentioned earlier, the initial step in the structural model is to assess the fitness of the overall model. Similar to the fitness indices adopted to determine the model fitness for the measurement model, Table 7:7, presents the global model fit for the study.

CMIN					
Model	**NPAR**	**CMIN**	**DF**	**P**	**CMIN/DF**
Default model	100	1170.543	680	.000	1.721
Saturated model	780	.000	0		
Independence model	39	11895.176	741	.000	16.053

RMR, GFI				
Model	**RMR**	**GFI**	**AGFI**	**PGFI**
Default model	.028	.866	.846	.755
Saturated model	.000	1.000		
Independence model	.235	.175	.132	.166

Baseline Comparison					
Model	**NFI Delta1**	**RFI rho1**	**IFI Delta2**	**TLI rho2**	**CFI**
Default model	.902	.893	.956	.952	.956
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

RMSEA				
Model	**RMSEA**	**LO 90**	**HI 90**	**PCLOSE**
Default model	.044	.039	.048	.994
Independence model	.199	.196	.202	.000

Table 7:7: Structural Model Fit Indices

As observed from the above Table 7:7, the fit indices adopted for this study are the CMIN/DF, RMR, SRMR, GFI, CFI, RMSEA and PCLOSE. From the cut-off criteria, listed in (*Table 0:5*), the acceptance criteria for the indices are CMIN/DF ≤ 2, RMR and SRMR ≤ 0.08, GFI ≥ 0.85, CFI ≥ 0.95, RMSEA ≤ 0.05 and the PCLOSE is expected to be 1 or close to 1. These acceptance criteria show that the model has a good overall model fit, as all the indices fall within the acceptance criteria based on the CMIN/DF = 1.721, RMR = 0.028, SRMR = 0.0398, GFI = 0.866, CFI = 0.956, RMSEA = 0.044 and PCLOSE = 0.994. As a result of the model fit indices, the structural research model was accepted as representing the data obtained in the study.

7.5.2 Hypothesis Testing

In SEM analysis, a prerequisite to hypothesis testing is the confirmation of the measurement and the structural models. This confirmation is to establish the extent to which the structural

model explains the sample variance-covariance of the data. This allows the hypothesised model to be tested simultaneously to assess the model's consistency with the sample data (Kline, 2015). In this study, even though some of the hypothesis were developed from the outcome of the qualitative research and the literature review, which may imply that some of the hypothesis can be confirmed. However, since there are no previous empirical studies along this specific field of inquiry, and the qualitative research only samples a few of the population. Therefore, this study reviews all the paths in the hypothesised model.

To test the hypotheses in AMOS, the analyses requested both the standardised and unstandardised regression weights, which is observed in Table 7:8, below. In addition to the regression weights, the regression estimates, standard errors (S.E), the critical ratio (C.R) (i.e. the ratio of the regression estimates and the underlying standard errors), as well as the p-values (which is an approximate probability of obtaining a chi-square statistics as large as the chi-square statistic gotten from the sample data) were requested from the AMOS output. To clarify, the p-values represent the measure of significant level in the prediction of the endogenous variables, by its predictor and describes the departure of the sample data from the model.

	Standardised Estimates	Estimate	S.E.	C.R.	P	Notes
Trust <--- All.Fun	.271	.261	.060	4.351	***	Confirmed
Contracts <--- All.Fun	.510	.580	.074	7.851	***	Confirmed
Trust <--- Man.Ten	.059	.048	.049	.990	.322	NS
Contracts <--- Man.Ten	-.023	-.022	.054	-.420	.674	NS
Contracts <--- SCF	.115	.110	.058	1.904	.057	NS
Trust <--- SCF	.184	.149	.053	2.812	.005	Confirmed
ICP <--- Trust	.411	.345	.050	6.915	***	Confirmed
UCP <--- Trust	.474	.484	.061	7.940	***	Confirmed
ICP <--- Contracts	.246	.175	.044	3.960	***	Confirmed
UCP <--- Contracts	.117	.153	.049	3.139	.002	Confirmed
ICP <--- All.Fun	.119	.096	.044	2.182	.029	Confirmed
UCP <--- Man.Ten	.095	.079	.039	2.033	.042	Confirmed
ICP <--- SCF	.043	.029	.038	.764	.445	NS
UCP <--- SCF	-.055	-.046	.048	-.958	.338	NS

As observed from the Table 7:8 above which is an overview of the hypothesised relationships between the constructs, some of the hypothesised relationships in the model are not significant at the $p < 0.01$ and $p < 0.05$. These relationships would be assessed individually in the following sections.

7.5.3 Assessing the Individual Hypothesis

Hypothesis I(a): *The effects of Transactional Governance (contracts) on Intended Coopetition Performance (ICP) is positive.*

With this hypothesis, it is expected that adopting transactional governance to maintain the coopetition, mainly intended coopetition would result in a positive coopetition performance. This hypothesis was proposed to show that a direct positive relationship exists between transactional governance and intended coopetition, such that the presence of contractual agreements when engaging in intended coopetition would result in a successful coopetition performance.

To estimate the relationship between these constructs, a regression path from 'Contracts' to 'ICP' was specified in the structural model, to test the existence of a direct relationship. The result of this specification as seen in the SEM output Table 7:8, produced an unstandardised estimate of (.175), a standard error of (.044), a critical ratio of (3.960) and a standardised estimate of (.246). From the output, the probability of obtaining a C.R as large as 3.960 in absolute value is less than 0.001 significant level. Hence, the regression weight for transactional governance, predicting the performance of intended coopetition is significantly different from zero at the 0.001 level (two-tailed). It also shows that a unit change in the standard deviation of 'contracts' is likely to result in an increase of .246 standard deviation in 'ICP'.

From the estimates presented, the presence of transactional governance contributes significantly to the explanation of improving coopetition performance when the relationship is appropriately planned before commencement. Thus, organisations are likely to experience a successful coopetition endeavour, when there is a thorough legal agreement to both monitor and reassure the partners in the relationship about their roles and the consequences of their actions. This finding is consistent with the outcome of the qualitative study, where all the

respondents agreed that transactional governance is vital for ensuring an IOR is successful, particularly a complicated relationship such as coopetition.

Hypothesis I(b): The effects of Transactional Governance (contracts) on Unintended Coopetition Performance (UCP) is positive.

Similar to the hypothesis I(a), this hypothesis expects that adopting transactional governance to maintain coopetition, even coopetition that occurs as an unintended strategy in organisations would result in a positive coopetition performance. This hypothesis was proposed to show that a direct positive relationship exists between transactional governance and IORs, even when the organisations are unaware of the true nature of their IO relationship. The hypothesis intends to show that the presence of contractual agreements in any form of coopetition, including emergent coopetition, would increase the chances of a successful coopetition performance.

To estimate the relationship between these constructs, a regression path from 'Contracts' to 'UCP' was specified in the structural model, to test the existence of a direct relationship. The result of this specification as seen in the SEM output Table 7:8, produced an unstandardised estimate of (.153), a standard error of (.049), a critical ratio of (3.139) and a standardised estimate of (.117). From the output, the probability of obtaining a C.R as large as 3.139 in absolute value is 0.002 significant level. Hence, the regression weight for transactional governance, predicting the performance of intended coopetition is significantly different from zero at the 0.05 level (two-tailed). It also shows that a unit change in the standard deviation of 'contracts' is likely to result in an increase of .117 standard deviation in 'UCP'.

From the above estimates, it can be concluded that adopting a transactional means of governance contributes significantly to the explanation of improving coopetition performance, even when the parties are unaware, they are engaging in a coopetitive relationship. Thus, the presence of a thorough contractual agreement, stating the roles, expectations and potential consequences for all parties engaged in an IOR, such as coopetition, even when the relationship is not specified as 'coopetition' can positively influence the outcome of the endeavour. As above, this finding is consistent with the outcome of the qualitative interviews, where the participants stressed the importance of transactional governance in any IO endeavour in the OGI, mainly because of the nature of the industry. The industry is highly regulated, and organisations are concerned about acquiring unnecessary risks, and as such are meticulous

about transactional governance to ensure all roles and expectations in a relationship are clearly laid out, to protect themselves against any further legal issues.

Hypothesis II(a): *There is a positive relationship between Relational Governance (Trust) and Intended Coopetition Performance.*

With this hypothesis, it is expected that adopting relational governance to maintain the coopetition, mainly intended coopetition would result in a positive coopetition performance. This hypothesis was proposed to show that a direct positive relationship exists between relational governance and intended coopetition, such that the presence of trust when engaging in intended coopetition would result in a successful coopetition performance.

To estimate the relationship between these constructs, a regression path from 'Trust' to 'ICP' was specified in the structural model, to test the existence of a direct relationship. The result of this specification as seen in the SEM output Table 7:8, produced an unstandardised estimate of (.345), a standard error of (.050), a critical ratio of (6.951) and a standardised estimate of (.411). From the output, the probability of obtaining a C.R as large as 6.951 in absolute value is less than 0.001 significant level. Hence, the regression weight for relational governance, predicting the performance of intended coopetition is significantly different from zero at the 0.001 level (two-tailed). It also shows that a unit change in the standard deviation of 'trust' is likely to result in an increase of .411 standard deviation in 'ICP'.

From the estimates presented, the presence of relational governance contributes significantly to the explanation of improving coopetition performance when the relationship is appropriately planned before commencement. Thus, organisations are expected to experience a successful coopetition endeavour when there is a trusting relationship among the coopetition partners. This finding is consistent with previous coopetitive studies such as Chin et al. (2008), which suggests that trust is one of the critical coopetition success factors. From the qualitative research, some respondents agree relational governance can also foster the outcome of a coopetitive endeavour.

Hypothesis II(b): *There is a positive relationship between Relational Governance (Trust) and Unintended Coopetition Performance.*

As with hypothesis II(a), this hypothesis expects that relational governance is useful for maintaining coopetitive relationships, even when the coopetition is an emergent strategy for the organisations. This hypothesis was proposed to show that a direct positive relationship exists between relational governance and IORs, even when the organisations are unaware of the true nature of their IO relationship. The hypothesis intends to show that the presence of trust in any form of coopetition, including emergent coopetition, can bolster the chances of a successful coopetition performance.

To estimate the relationship between these constructs, a regression path from 'Trust' to 'UCP' was specified in the structural model, to test the existence of a direct relationship. The result of this specification as seen in the SEM output Table 7:8, produced an unstandardised estimate of (.484), a standard error of (.061), a critical ratio of (7.940) and a standardised estimate of (.474). From the output, the probability of obtaining a C.R as large as 7.940 in absolute value is less than 0.001 significant level. Hence, the regression weight for relational governance, predicting the performance of unintended coopetition is significantly different from zero at the 0.001 level. It also shows that a unit change in the standard deviation of 'trust' is likely to result in an increase of .474 standard deviation in 'UCP'.

From the above estimates, it can be concluded that adopting a relational means of governance contributes significantly to the explanation of improving coopetition performance, even when the parties are unaware, they are engaging in a coopetitive relationship. Thus, the presence of a thorough trust in coopetition even when the relationship is not specified as 'coopetition' can positively influence the outcome of the endeavour. As above, this finding confirms the assertion by several coopetition scholars about the positive role of trust in coopetition. More importantly, the results are in line with Mariam (2018)'s, the study of the tourism industry, where it was found that trust is vital even in emergent coopetition. Also though the participants in the qualitative research suggest that transactional governance is more effective than relational governance, they still agree that a certain degree of trust, is vital for a successful coopetition performance.

Hypothesis III(a): There is a positive relationship between organisations that have a dedicated Alliance Function (All.Fun), and the adoption of Transactional Governance (Contracts).

This hypothesis suggests that organisations that have a dedicated alliance function, which is responsible for all their IORs would favour the use of transactional governance when entering

relationships with other organisations. The hypothesis seeks to show that when a dedicated alliance team manages a coopetition relationship, transactional governance is a preferred means of governance.

To estimate this hypothesis, a regression path was specified from 'All.Fun' to 'Contracts' in the structural model, to allow an assessment of a direct relationship between these constructs. As a result, an unstandardised estimate of (.580), a standard error of (0.74), a critical ratio of (7.851) and a standardised estimate of (.510) was attained as observed in Table 7:8. This output shows that the probability of obtaining a C.R as large as 7.851 in absolute value is less than 0.001 significance level. As a result, the regression weight for alliance function, implying the use of transactional governance is significantly different from zero at the 0.001 level. It also shows that a unit change in the standard deviation of 'All.Fun' is likely to result in an increase of .510 standard deviation in 'Contracts'.

The estimates above confirm that an organisation having a strong, dedicated alliance function to manage and monitor their inter-organisational relationships, including coopetitive arrangements would use a transactional means to governance to attain coopetition success. This finding is in line with the outcome of the qualitative study, where the respondents believe that having an alliance function increases the need for transactional governance as having an alliance function proves that the organisation values IORs and would, therefore, ensure the organisation is protected from any additional dangers or risks caused by IORs.

Hypothesis III(b): *There is a positive relationship between organisations that have a dedicated Alliance Function (All.Fun), and the adoption of Relational Governance (Trust).*

As with hypothesis III(a) discussed above, this hypothesis suggests that there is a relationship between having a dedicated alliance function and relational governance. Such that the alliance team may have built a trusting relationship with their alliance partners over the course of engaging in IORs which then suggests that the alliance team may likely use the relational governance to monitor the IORs among competitors.

To estimate this hypothesis, a regression path was specified from 'All.Fun' to 'Trust' in the structural model, to allow an assessment of a direct relationship between these constructs. As a result, an unstandardised estimate of (.261), a standard error of (.060), a critical ratio of (4.351) and a standardised estimate of (.271) was attained as observed in Table 7:8. This output

shows that the probability of obtaining a C.R as large as 4.351 in absolute value is less than 0.001 significance level. As a result, the regression weight for alliance function, implying the use of relational governance is significantly different from zero at the 0.001 level. It also shows that a unit change in the standard deviation of 'All.Fun' is likely to result in an increase of .271 standard deviation in 'Trust'.

This finding is not surprising as several authors studying organisational behaviours suggests that organisations are more inclined to adopt a relational form of governance if the organisations, they are entering into a relationship with has a good track record and experiential learning (Rothaermel & Boeker, 2008).

Hypothesis III(c): *The relationship between having a dedicated alliance function (All.Fun) and successfully intended coopetition (ICP) is positive.*

This hypothesis suggests that an organisation having a dedicated alliance function would increase its chances of having successfully intended coopetition. When an organisation has a dedicated alliance team, they are able to meticulously assess every relationship their organisation enters as such, if the organisation is involved in coopetition, it would be intended coopetition, with all the prerequisites to the relationship met prior to commencement, which then suggests that the relationships would be successful.

To estimate this hypothesis, a regression path was specified from 'All.Fun' to 'ICP' in the structural model, to allow an assessment of a direct relationship between these constructs. From the SEM output (Table 7:8), the unstandardised estimate of 0.96, with a standard error of .044, a critical ratio of 2.182, a standardised estimate of .119 and a p-value of 0.29 was achieved. This suggests that 'ICP' increases by .119 standard deviations when 'All.Fun' increase by 1 standard deviation. The estimates suggest that the probability of achieving a C.R as large as 2.182 in absolute value is .029. As a result, the regression weight for 'All.Fun' in the prediction of 'ICP', is significantly different from zero at the .05 level (two-tailed).

Therefore, the hypothesised relationship between alliance function and successful intended coopetition performance is supported and confirmed in this study. This implies that the sample data support the hypothesised relationship between having a dedicated alliance team in an organisation and the outcome of intended coopetition, thus, accepting the hypothesis.

***Hypothesis IV(a):** The relationship between having the ability to Manage Tensions (Man.Ten) and adopting a transactional governance mechanism is positive.*

This hypothesis was proposed to estimate the relationship between an organisations capability to manage tensions and the adoption of transactional governance. It seeks to test if the ability to manage tensions influences the choice of transactional governance mechanism in managing IORs.

To depict this hypothesis in the structural model, a regression path is specified from 'Man.Ten' to 'Contracts'. From the path analysis in the SEM output, the unstandardised regression weight shows a decrease in the transactional governance by .022 when the ability to manage tension increases by 1 with a standard error of .054, a critical ratio of -.420 and p-value of .674. Additionally, the standard regression estimates show that there is a decrease in the transactional governance by .023 when the ability to manage tension increases by 1 standard deviation.

From the findings, the probability of achieving a C.R. as large as .420 in absolute value is .674 and the regression estimate for 'Man.Ten' positively influencing 'Contracts' is not significantly different from zero at the .05 level. This finding suggests that an organisation's capacity to manage inter-organisational tensions does not influence the choice of transactional governance. Hence, the hypothesis is not supported by the sample data of this study and is therefore rejected.

***Hypothesis IV(b):** The relationship between having the ability to Manage Tensions (Man.Ten) and adopting a relational governance mechanism is positive.*

This hypothesis was proposed to determine if the ability of an organisation to manage tensions in inter-organisational relationships, a positive effect on the adoption of relational governance as a mechanism to oversee the relationship. Since one of the drawbacks of coopetition is the ability to manage the inherent tension, this hypothesis seeks to understand how having a capable tension management capability can influence the choice of governance structure, such as the relational governance technique.

To test this hypothesis, a regression path from 'Man.Ten' to 'Trust' was identified and specified in the structural model to allow an assessment of the relationships between the two constructs. The SEM output (Table 7:8), reveals that the unstandardised regression weight .048, standard error of .049, a critical ratio of .990, a standard estimate of .059 and a p-value of .322. These estimates suggest that the influence of tension management on relational governance is

not statistically significant at p < .05. From the unstandardised estimates, a unit increase in tension management has a positive influence on relational governance by .048. Similarly, the standardised regression estimates indicate that when 'Man.Ten' increases by 1 standard deviation, it can result in an increase of .049 standard deviation in 'Trust'.

Thus, the probability of obtaining a C. R as large as .990 in absolute value is .322 and the regression weight for 'Man.Ten' influencing 'Trust' is not significantly different from zero at the .05 level. Even though these findings suggest that possessing a tension management capability may influence the adoption of relational governance, the estimates are not statistically significant. This shows that the sample data is not consistent with the hypothesis, and therefore, the hypothesis is rejected.

Hypothesis IV(c): The relationship between having the ability to Manage Tensions (Man.Ten) and successful unintended coopetition (UCP) is positive.

This hypothesis suggests that if an organisation can adequately manage the tensions in an inter-organisational relationship, then the chances of achieving successful coopetition, when the strategy is emergent increases. An organisations ability to properly manage inter-organisational tensions may imply that even if the organisation engages in unintended coopetition, as an emergent strategy, the organisations may still achieve a beneficial outcome in the coopetition performance.

To test this hypothesis, a regression path was specified from 'Man.Ten' to 'UCP' in the structural model to allow an assessment of a direct relationship between these constructs. From the SEM output, the unstandardised estimate of .079, with a standard error of .039, a critical ratio of 2.033, a standard estimate of .095 and a p-value of 0.42 was achieved. This suggests that 'UCP' increases by .095 standard deviations when 'Man.Ten' increases by 1 standard deviation. The estimate indicates that the probability of achieving a C.R as large as 2.033 in absolute value is 0.42. As a result, the regression weight for 'Man.Ten' influencing 'UCP', is borderline significantly different from zero at the .05 level. Therefore, the hypothesis is confirmed.

The estimates reveal that having the capacity to manage inter-organisational tensions increases an organisations chance of attaining beneficial coopetition even if the organisations involved are unaware of the true nature of the relationship they are engaged in, or if coopetition is

adopted in the organisations as an emergent strategy. This shows that irrespective of the nature in which the coopetition came about, being able to effectively manage the tensions that arise in from the relationship would be beneficial in ensuring a successful outcome for the endeavour. Additionally, even though the p-value is borderline significant, there estimates still shows some level of significance, which has resulted in the acceptance of the hypothesis.

Hypothesis V(a): *There is a positive relationship between organisations that have a flexible supply chain function, and the adoption of Transactional Governance (Contracts).*

With this hypothesis, the relationship between having a flexible supply chain function in an organisation and the adoption of transactional governance can be assessed. From the outcome of the qualitative study and the review of literature, a flexible supply chain is one that is able to respond quickly to changes in the business environment while ensuring it maintains or improves its competitive advantage. As such, an organisation engaging in coopetition suggests the willingness of the organisation to enhance its competitive advantage and would value the outcome of the alliance, by ensuring the SC is not vulnerable to unnecessary risks. Therefore, it becomes necessary to access the relationship that exists between the SCF and the governance mechanism.

To test this hypothesis, a regression path from 'SCF' to 'Contracts' was identified and specified in the structural model to allow an assessment of the relationship between the two constructs. The SEM output (Table 7:8), reveals that the unstandardised regression weight .110, standard error of .058, a critical ratio of 1.904, a standard estimate of .115 and a p-value of .057. These estimates suggest that the influence of SCF on Contracts is not statistically significant at $p < .05$. From the unstandardised estimates, a unit increase in supply chain flexibility has a positive impact on transactional governance by .110. Similarly, the standardised regression estimates indicate that when 'SCF' increases by 1 standard deviation, it can result in an increase of .115 standard deviation in 'Contracts'. Also, the probability of obtaining a C. R as large as 1.904 in absolute value is .057, and the regression weight for 'SCF' influencing 'Contracts' is not significantly different from zero at the .05 level. Even though these findings suggest that possessing a flexible supply chain may influence the adoption of transactional governance, the estimates are not statistically significant. This shows that the sample data is not consistent with the hypothesis, and therefore, the hypothesis is rejected.

Hypothesis V(b): There is a positive relationship between organisations that have a flexible supply chain function, and the adoption of Relational Governance (Trust).

As in hypothesis V(a), above, this hypothesis seeks to assess the relationship between having a flexible supply chain function in an organisation and the adoption of relational governance. It aims to establish the relationship that exists between having a flexible supply chain capable of adapting to a changing business environment and governance mechanism, i.e. relational.

To test this hypothesis, a regression path from 'SCF' to 'Trust' was identified and specified in the structural model to allow an assessment of the relationship between the two constructs. The SEM output (Table 7:8), reveals that the unstandardised regression weight .149, standard error of .053, a critical ratio of 2.812, a standard estimate of .184 and a p-value of .005. These estimates suggest that the influence of SCF on Trust is statistically significant at $p < .05$.

From the unstandardised estimates, a unit increase in supply chain flexibility has a positive influence on relational governance by .149. Similarly, the standardised regression estimates indicate that when 'SCF' increases by 1 standard deviation, it can result in an increase of .184 standard deviation in 'Trust'. Also, the probability of obtaining a C. R as large as 2.812 in absolute value is .005 and the regression weight for 'SCF' influencing 'Trust' is significantly different from zero at the .05 level. These findings suggest that possessing a flexible supply chain may influence the adoption of relational governance for managing a coopetitive alliance. This shows that the sample data is consistent with the hypothesis, and therefore, the hypothesis is confirmed.

Hypothesis V(c): There is a positive relationship between organisations that have a flexible supply chain function, and the outcome of intended coopetition.

This hypothesis was proposed to establish a relationship between having a flexible supply chain and the outcome of intended coopetition. As explained above, this hypothesis is concerned with investigating whether having a flexible supply chain can influence the outcome of intended coopetition performance. It expected that having a flexible supply chain, i.e. being both proactive and reactive in responding to changes in the business environment such as the decline in the price of crude oil in the OGI and economic issues such as the Brexit would positively influence the outcome of coopetition practices within the industry.

To test this hypothesis, a regression path from 'SCF' to 'ICP' was identified and specified in the structural model to allow an assessment of the relationship between the two constructs. The SEM output (Table 7:8), reveals that the unstandardised regression weight .029, standard error of .038, a critical ratio of .764, a standard estimate of .043 and a p-value of .445. These estimates suggest that the influence of SCF on ICP is not statistically significant at $p < .05$.

From the unstandardised estimates, a unit increase in supply chain flexibility has a positive influence on intended coopetition performance outcome by .029. Similarly, the standardised regression estimates indicate that when 'SCF' increases by 1 standard deviation, it can result in an increase of .043 standard deviation in 'ICP'. Also, the probability of obtaining a C. R as large as .764 in absolute value is .445 and the regression weight for 'SCF' influencing 'ICP' is not significantly different from zero at the .05 level. Even though these findings suggest that possessing a flexible supply chain may influence the adoption of the outcome of intended coopetition performance, the estimates are not statistically significant. This shows that the sample data is not consistent with the hypothesis, and therefore, the hypothesis is rejected.

Hypothesis V(d): There is a positive relationship between organisations that having a flexible supply chain function, and the outcome of unintended coopetition.

As with hypothesis V(c) above, this hypothesis seeks to establish a relationship between having a flexible supply chain and the outcome of unintended coopetition performance. The relationship between these two constructs is expected to be positive, such that having a flexible supply chain may influence a successful coopetition performance even if the coopetition is adopted as an emergent strategy.

To depict this hypothesis in the structural model, a regression path is specified from 'SCF' to 'UCP'. From the path analysis in the SEM output, the unstandardised regression weight shows a decrease in the UCP by .046 when the ability to manage tension increases by 1 with a standard error of .048, a critical ratio of -.958 and p-value of .338. Additionally, the standard regression estimates show that there is a decrease in the UCP by .055 when SCF increases by 1 standard deviation.

From the findings, the probability of achieving a C.R. as large as .958 in absolute value is .338 and the regression estimate for 'SCF' positively influencing 'UCP' is not significantly different from zero at the .05 level. This finding suggests that having a flexible supply chain does not

influence the outcome of emergent coopetition. Hence, the hypothesis is not supported by the sample data of this study and is therefore rejected.

7.5.4 Hypothesis Based on Indirect Effects

The section above confirmed the existence of direct relationships (both significant and insignificant) between the success factors, governance mechanism and the outcome of both intended and unintended coopetition with the structural model presented above. This study, therefore, seeks to assess the sample data for any evidence of indirect effects between the antecedents and the outcome of the coopetition. Indirect effects, which can be effects caused by moderation or mediation interactions between the constructs. An indirect analysis is a form of regression analysis, where the effects of an IV on a DV is transmitted through another variable in the model. This section would, therefore, examine how some of the independent variables in the model can explain the dependent variables.

To achieve this, an interaction (moderation) analyses and mediation analyses were conducted using both SPSS and AMOS software. SPSS was used to order the interactions between variables to enable the estimation of the moderation effects in the model. For the mediation analysis, AMOS was used to perform an indirect, direct and total effect based on a bootstrapping approach with 1000 resampling (recommended by Cheung & Lau, 2008). The bootstrapping approach, which is available on the AMOS software, was conducted with 95% bias-corrected confidence intervals to ensure the robustness of the mediation analysis.

7.5.4.1 *Assessing Moderation (Interaction) Effects*

As explained above, SPSS software was used to create an interaction variable to access the effects of interacting 'SCF' with both the 'Man.Ten' and 'All.Fun' to examine how the variables would affect 'UCP' and 'ICP'. As a result, two new variables 'SCF_x_All.Fun' and 'SCF_x_Man.Ten' were created and inputted into the model, as seen in Figure 7.4, below.
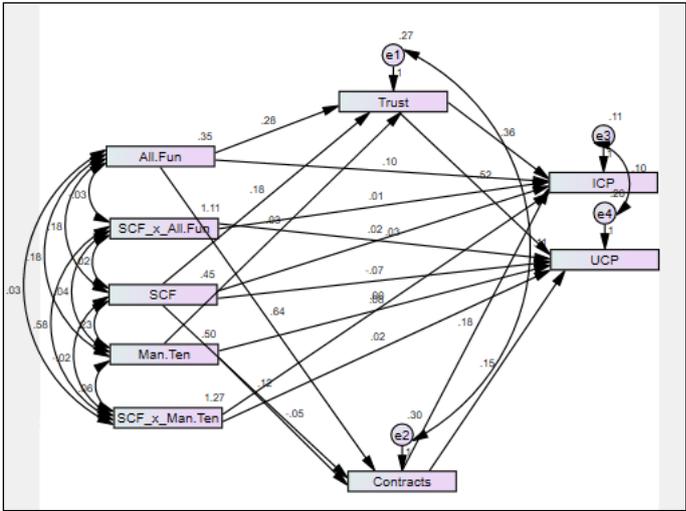
Figure 7.4: Interaction Structural Model

As with any model in SEM, it is crucial to estimate the global model fit for any model, for the model represented in Figure 7.4, has a good global fit, as all the indices fall within the acceptance criteria based on the CMIN/DF = 0.500, RMR = 0.008, GFI = 0.998, CFI = 1.000, RMSEA = .000 and PCLOSE = 0.972.

	Standardised Estimates	Unstandardised Estimate	S.E.	C.R.	P	Notes
ICP <--- SCF_x_All.Fun	.030	.013	.018	.716	.474	NS
UCP <--- SCF_x_Man.Ten	.033	.017	.024	.719	.472	NS
UCP <--- SCF_x_All.Fun	.058	.032	.025	1.274	.203	NS
ICP <--- SCF_x_Man.Ten	.006	.002	.017	.140	.888	NS

Table 7:9: Standardised Regression Weight for the Interaction Model

Hypothesis VI(a): There is a positive relationship between the interacting effect of having a flexible supply chain and having a dedicated alliance function, and the outcome of unintended coopetition.

With this hypothesis, an interaction effect between having a flexible supply chain and utilising a dedicated alliance function in an organisation to manage the coopetition alliance, with the outcome of unintended coopetition is established. Put simply; the hypothesis would establish

how having both a flexible supply chain and a dedicated alliance function would affect the outcome of unintended coopetition.

To assess this hypothesis, a new interaction variable was created by multiplying the total score of SCF by the total score of All.Fun, since AMOS can not directly analyse moderation effects. From Table 7:9, it can be observed that an estimate of .032, S.E of .025, C.R of 1.274 and a p-value of .203 were produced. These estimates show that an increase of .032 in UCP due to a unit increase in the interaction of SCF and All.Fun and a standardised estimate suggest that UCP increases by .058 standard deviations due to the contribution of 1 standard deviation based on the interaction of flexible supply chain and a dedicated alliance function.

The estimates also show that the likelihood of obtaining a C.R as large as 1.274 in absolute value is .203, suggesting that the regression weight for the interaction effect of supply chain flexibility and a dedicated alliance function in predicting the performance of unintended coopetition is not significantly different from zero at the .05 level (two-tailed). Thus, the sample data does not support the hypothesis, which leads to the rejection of the hypothesis.

Hypothesis VI(b): *There is a positive relationship between the interacting effect of having a flexible supply chain and having a dedicated alliance function, and the outcome of intended coopetition.*

As with hypothesis VI(a) above, this hypothesis seeks to establish the effects of the interaction between supply chain flexibility and alliance function on the outcome of intended coopetition.

To test this hypothesis, a new interaction variable was created by multiplying the total scores of SCF and All.Fun and then specifying a regression path from the interaction variable 'SCF_x_All.Fun' to ICP to allow an assessment of the constructs. The SEM output (Table 7:9), reveals an unstandardised regression weight .013, standard error of .018, a critical ratio of .716, a standard estimate of .030 and a p-value of .474. These estimates suggest that the influence of 'SCF_x_All.Fun' on ICP is not statistically significant at p < .05.

From the unstandardised estimates, a unit increase in the interaction of supply chain flexibility and alliance function has a positive influence on intended coopetition performance by .013. Similarly, the standard regression estimates indicate that when 'SCF_x_All.Fun' increases by 1 standard deviation; it can result in an increase of .030 in 'ICP'. The estimate also shows that the probability of obtaining a C.R. as large as .716 in absolute value is .474 and the regression

weight for 'SCF_x_All.Fun' influencing ICP is not significantly different from zero at the .05 level. These estimates show that the sample data is not consistent with the hypothesis, and thus, the hypothesis is rejected.

Hypothesis VI(c): There is a positive relationship between the interacting effect of having a flexible supply chain and the ability to manage tension, and the outcome of unintended coopetition.

This hypothesis estimates the possible interaction effects of an organisations supply chain flexibility and their ability to manage organisational tensions on the outcome of unintended coopetition. It is expected that when an organisation's supply chain is flexible, and they possess the ability to manage inter-organisational tensions, then there would be a positive influence on the outcome of emergent coopetition.

To test this hypothesis, a regression path from a newly created interaction variable 'SCF_x_Man.Ten' to UCP was identified and specified in the structural model. The SEM output (Table 7:9), reveals that the unstandardised regression weight of .017, standard error of .024, a critical ratio of .719, a standard estimate of .033 and a p-value of .472. These estimates suggest that the interactions between SCF and Man.Ten on UCP are not statistically significant at $p < .05$. From the unstandardised estimates, a unit increase in SCF_x_Man.Ten has a positive influence on UCP by .017. Similarly, the standardised regression estimates indicate that when the interaction between supply chain flexibility and tension management increases by 1 standard deviation, it can result in an increase of .033 in unintended coopetition. Additionally, the probability of obtaining a C.R. as large as .719 in absolute value is .472 and the regression weight for SCF_x_Man.Ten influencings 'UCP' is not significantly different from zero at the .05 level. This shows that the sample data is not consistent with the hypothesis, and therefore, the hypothesis is rejected.

Hypothesis VI(d): There is a positive relationship between the interacting effect of having a flexible supply chain and the ability to manage tension, and the outcome of intended coopetition.

As with hypothesis VI(c) above, this hypothesis seeks to establish the effects of the interaction between supply chain flexibility and manage tension on the outcome of intended coopetition.

To test this hypothesis, a new interaction variable was created by multiplying the total scores of SCF and Man.Ten and then specifying a regression path from the interaction variable 'SCF_x_Man.Ten' to ICP to allow an assessment of the constructs. The SEM output (Table 7:9), reveals an unstandardised regression weight .002, standard error of .017, a critical ratio of .140, a standard estimate of .006 and a p-value of .888. These estimates suggest that the influence of 'SCF_x_Man.Ten' on ICP is not statistically significant at p < .05.

From the unstandardised estimates, a unit increase in the interaction of supply chain flexibility and tension management has a positive influence on intended coopetition performance by .002. Similarly, the standard regression estimates indicate that when 'SCF_x_Man.Ten' increases by 1 standard deviation, it can result in an increase of .006 in 'ICP'. The estimate also shows that the probability of obtaining a C.R. as large as .140 in absolute value is .888 and the regression weight for 'SCF_x_Man.Ten' influencing ICP is not significantly different from zero at the .05 level. These estimates show that the sample data is not consistent with the hypothesis, and thus, the hypothesis is rejected.

7.5.4.2 *Assessing the Mediation Effects*

The previous sections examined the direct and indirect effects of critical coopetition success factors and governance mechanism on the outcome of both emergent and intended coopetition. Following the analysis, it is necessary to conduct a mediation analysis regarding how the governance mechanism affects the outcome of coopetition. To access the mediation effects, the direct, indirect and total effects were requested on the AMOS software, based on the bootstrap approximation obtained by constructing 2-sided bias-corrected confidence intervals based on 1000 bootstrapping samples with 95% confidence intervals.

Relationship	Effects		Comments
	Direct	Indirect	
All.Fun →Trust → ICP	.123**	.032	NS
All.Fun → Contracts → ICP	.123**	.106**	Partial Meditation
** = Significant, NS = Not Significant			

Table 7:10: Mediating Effects of Governance Structure

Hypothesis III(c) ii. *Transactional governance is expected to mediate the positive effects of alliance function on intended coopetition performance.*

From the hypothesised model and structural path represented in (Figure 7.3). A mediation path is proposed to partially mediate the relationship between an organisation having an active, dedicated alliance function which monitors its inter-organisational relationships and the outcome of intended coopetition. It is assumed that an organisation that has a dedicated alliance function would be deliberate about the forms of IORs it engages in and would also take measure to ensure the success of the endeavour. Such measures would include adopting a transaction governance mechanism to manage the coopetition relationship, which, is expected to positively influence the outcome of the relationship. In simpler terms, organisations that have a dedicated alliance function are expected to have a better performance outcome in intended coopetition; however, the likelihood of successful coopetition is based on the mood of governance mechanism utilised (i.e. transactional governance).

When performing meditation in AMOS, in models that contain more than one mediation path, it is essential to separate these paths as AMOS analyses the indirect mediation together, rather than individually assessing the paths. Hence, to analyse the indirect mediation effects of contracts on the relationship between alliance function and intended coopetition, the mediation effects of trust was removed from the model.

As a result, the mediation model with contracts mediating alliance function and intended coopetition attained model fit (CMIN/DF = 1.748, RMR =0.040, GFI = 0.864, CFI = 0.954, RMSEA = 0.044 and PCLOSE = 0.987), with all the observed indices exceeding the minimum threshold. The rationale behind the mediation model is to account for both the unique direct and indirect effects of contracts on the intended coopetition outcome.

From the standardised direct estimates, the unmediated effect of alliance function on intended coopetition performance is .123, implying that, intended coopetition performance will increase by .123 standard deviations with a unit standard deviation increase in alliance function as a result of the direct effects of alliance function on intended coopetition performance. The standardised direct effect of alliance function on intended coopetition performance is significantly different from zero at the 0.050 level (p = 0.033, 2-tailed) based on the bootstrap approximation obtained by constructing 2-sided bias-corrected confidence intervals.

From the standardised indirect estimates, the mediated effects of alliance function on intended coopetition performance through contracts is .106. This estimate suggests that a unit standard

deviation increase in alliance function influences an increase of .106 standard deviations in intended coopetition performance. Hence, the standardised indirect effect of alliance function on intended coopetition performance through transactional governance is also significant at the 0.050 level (p = 0.002, 2-tailed).

Since the standardised direct and indirect paths are statistically significant, it can be concluded that the positive relationship that exists between alliance function and intended coopetition performance is partially mediated by transactional governance. As a result, the hypothesis is consistent with the sample data and thus supports that organisations with a dedicated alliance function are more likely to have an increased chance of intended coopetition success if they utilise transactional governance.

Hypothesis III(c) iii. *Relational governance mechanism mediates the positive effects of alliance function on intended coopetition performance.*

As with hypothesis III(c) ii above, a mediation path is proposed to partially mediate the relationship between an organisation having an effective dedicated alliance function which monitors its inter-organisational relationships and the outcome of intended coopetition. It is assumed that an organisation that has a dedicated alliance function would be deliberate about the forms of IORs it engages in and would also take measure to ensure the success of the endeavour. Such alliances functions would seek to develop trusting relationships among organisations that they are involved with and as such may rely on relational governance to monitor the relationships. Hence, it is expected that relational governance would positively influence the outcome of a coopetitive relationship. In simpler terms, organisations that have a dedicated alliance function are expected to have a better performance outcome in intended coopetition; however, the likelihood of successful coopetition is based on the mood of governance mechanism utilised (i.e. Relational governance).

To analyse the indirect mediation effects of trust on the relationship between alliance function and intended coopetition, the mediation effects of contracts was removed from the model. As a result, the mediation model with trust mediating alliance function and intended coopetition attained model fit (CMIN/DF = 1.828, GFI= 0.858, CFI= 0.949, NFI= 0.895, RMSEA= 0.047 and PCLOSE= 0.903), with all the observed indices exceeding the minimum threshold. The rationale behind the mediation model is to account for both the unique direct and indirect effects of trust on the intended coopetition outcome.

From the standardised direct estimates, the unmediated effect of alliance function on intended coopetition performance is .123, implying that, intended coopetition performance will increase by .123 standard deviations with a unit standard deviation increase in alliance function as a result of the direct effects of alliance function on intended coopetition performance. The standardised direct effect of alliance function on intended coopetition performance is significantly different from zero at the 0.050 level (p = 0.035, 2-tailed) based on the bootstrap approximation obtained by constructing 2-sided bias-corrected confidence intervals.

From the standardised indirect estimates, the mediated effects of alliance function on intended coopetition performance through contracts is .032. This estimate suggests that a unit standard deviation increase in alliance function influences an increase of .032 standard deviations in intended coopetition performance. However, the standardised indirect effect of alliance function on intended coopetition performance through relational governance is not significant at the 0.050 level (p = 0.155, 2-tailed).

Since the standardised indirect effect of alliance function positively influencing intended coopetition through relational governance is not statistically significant, it can be concluded that there is no mediation effect. As a result, the hypothesis is not consistent with the sample data, which leads to the rejection of the hypothesis.

It is important to note that hypotheses (IV (c), ii and iii) cannot be tested to establish the mediation effects of the transactional and relational governance mechanism on the relationship between tension management and unintended coopetition performance. Due to the non-significant relationships that exist between tension management and the governance mechanisms (trust and contracts), the conditions for the conducting a mediation analysis are not satisfied (Baron and Kenny, 1986; Zhao et al., 2010). Therefore, the hypothesis regarding governance mechanism mediating the positive relationship between tension management and unintended coopetition performance is rejected.

7.6 CHAPTER SUMMARY

This chapter was concerned with the present, interpreting and explaining the results of the research. The initial part of the section presented the descriptive summary of the study, outlining the characteristics of the respondents with regards to their demographic, job function etc., to establish the fitness of the respondents to participate in the study, and to show the quality

of the data gathered. The second part of the chapter presented and discussed the main framework of the study, including testing the structural model, along with its accompanying hypotheses. Prior to testing the hypotheses, the measurement model was examined to establish the fitness of the data for structural modelling. Upon validating the measurement model, the structural equation model was analysed. Both the measurement and structural model were a good representation of the empirical data as they satisfied the condition of several fit indices.

Following the acceptance of the model, the various individual paths in the model were examined in the form of hypothesis testing for the direct, interacting and indirect relationships. These analyses were conducted to investigate the consistency of the model with the sample data, which then lead to the confirmation or rejection of the hypothesis. Both AMOS and SPSS statistical packages were used for the data analysis, accessing the direct and indirect effects, to allow a rigorous explanation of the factors that lead to successful coopetition performance.

The estimates of the direct relationships confirmed the central hypotheses that having a dedicated alliance function in an organisation is influential in attaining a successful performance in deliberate coopetition, and the ability of an organisation to manage inter-organisational tensions is beneficial to the performance of coopetition adopted as an emergent strategy. Additionally, the results show that both forms of transactional governance mechanisms (i.e. relational and transactional) can positively influence the outcome of deliberate and emergent forms of coopetition. The estimates also showed that having a flexible supply chain has no statistically significant influence on the outcome of either of the two forms of coopetition being reviewed.

Following the assessment of the direct relationships and since the effects of having a flexible supply chain were negligible, it became necessary to evaluate the interacting effects of the variables. As such, new variables were requested from SPSS to access the effects of the interaction between having a flexible supply chain and the ability to manage tension, as well as its effects with having a dedicated alliance function. The effects of these interacting variables on the performance of coopetition were examined and showed that there were no statistically significant effects.

Finally, a mediation analyse was conducted to attempt the explain how governance mechanism can explain the outcome of coopetition performance. The mediation analysis examined how the relational and transactional governance mechanisms, explains the direct relationship between alliance function and the outcome of intended coopetition. The results showed that

transactional governance partially mediates the relationship while relational governance has no mediating effect on the relationship between alliance function and intended coopetition. It should be noted that the mediation effects on other direct relationships in the model such as the relationship between tension management and emergent coopetition could not be analysed as the requirements for a mediation analysis were not met in the model.

The following chapter would interpret the outcome of the results and discuss its implications on the study. The section would also discuss some of the research limitations; conclusions, recommendations and implication for further studies would also be made.

Chapter 8: DISCUSSION AND CONCLUSION

8.1 INTRODUCTION

The underpinning objective of this study as identified in chapters 1, 2 and 3, is to explore the practice of coopetition in the UK oil and gas industry, by investigating its occurrence as an emergent strategy in the industry and the factors that drive its success. As a result, it identified factors such as; tension management, governance mechanism, and adopting a strategic alliance team contributes to the performance of the coopetition endeavour. A sequential mixed-methods approach, with the qualitative phase preceding and informing the quantitative phase, was used to achieve the primary objectives of the study.

This chapter discusses the results of the empirical findings presented in chapter 5 and 7. The discussion evaluates these findings in the context of the hypotheses proposed in chapter 5 and the research questions presented in chapter 3. This chapter addresses the implications of the results on coopetition practices and proposes recommendations for potential coopetition partners. The section also discusses the limitations to the study and recommends areas for further research.

The research problems identified in chapter one includes; the limited focus on the emergent form of coopetition and factors that drives its success; obscurity and the proper control mechanism, and tension management structure to guide a coopetition relationship that exists both deliberately and unintentionally; lack of research regarding how SCs affect the performance of coopetition. The research questions associated with these problems were highlighted in Section 3.7 while the research objectives was presented in 1.6.

The following discussions are arranged in a structure that answers each of the laid-out research questions and is in line with the study objectives.

8.2 COOPETITION IN THE OIL AND GAS INDUSTRY

Research Question

- *Q1: To what extent does coopetition already exist (intentionally and unintentionally) in the UK Oil and Gas Industry?*

The question here relates to the awareness and practice of coopetition in the oil and gas industry. It also seeks to uncover the extent unintentional coopetition in the industry as a result of collaboration occurring in a highly competitive space. As with the first objective, the literature was reviewed, and existing research was used to examine this question and provide initial guidance. Subsequently, an exploration of the OGI was conducted using semi-structured interviews. The initial review of the literature showed that coopetition could occur as an emergent strategy in line with the emergent strategy theory, which recognises that strategies can develop over time in the absence or despite a particular intention. Further studies on emergent coopetition proved that coopetition could occur unintentionally. One of the drivers of emergent strategies is the external environment. Studies found that emergent strategies can occur as a reaction to a changing business environment. Studies about emergent coopetition found that the industry changes, as well as industrial regulatory bodies, can force organisations into unplanned coopetition.

Unfortunately, there are only limited studies focused explicitly on investigating the emergence of coopetition in the OGI. Reviews about the drivers and success factors have been carried out within the industry, which implies that coopetition has been adopted as a deliberate strategy in the industry. Additionally, examples of coopetition; FPAL and JIP have been observed in the public domain as well as obtained from the exploratory interviews. The exploration study found that the oil and gas organisations are more open to coopetition that are concerned with industry-level activities, such as the standardisation of operations and creation of industry policies.

The examples of deliberate coopetition observed in the OGI occurs on an intra-network level, based on typology about the level of coopetition. Network-level coopetition is coopetition interactions that occur within clusters of firms, supply chains and industries. From the exploration interviews, no examples of any other levels of coopetition were evident. The study found that the deliberate coopetition in the sector occurred away from their end-users.

Even though the outcome of this form of network-level coopetition can improve the competitive advantage of the individual organisations in the alliance, the industry benefits more from the alliance, since the outcome of the alliance is to standardise, create state-of-the-art innovative tools and policies which can provide beneficial to the entire industry.

In addition, upon further exploration, it was found that the sector offers incentives such as tax rebate to organisations willing to collaborate. These two conditions, the change in the external

environment and the imposition of industrial regulatory bodies, in line with emergent strategy drivers, led to the assumption that coopetition occurs as an unintended strategy in the OGI.

From the exploration study, two instances of unintentional coopetition were uncovered. In the first instance, Res_05 revealed a direct coopetitive relationship with organisations in a different geographical location. The dynamics of the IOR between the organisations was expected to be a purely collaborative one. To cope with the downturn in the industry, organisations implemented cost-saving strategies, which included, providing capabilities for SMEs to complement their operations in international markets. However, it was observed that one of the organisations selected to cater to the needs of the Res_05's organisations also provides similar services to other smaller organisations. Thus, establishing that a coopetition relationship exists. Although both organisations share similar capabilities, their target audience is currently different. Therefore, suggesting that the type of coopetition being practised is the 'partnering situation', where there are little competition and high cooperation. The 'partnering situation' was also the form of coopetition observed in the second occurrence of coopetition found in the exploratory study, which involved two competing organisations pooling their resources and capabilities to execute a project.

An interesting, finding is that both examples of unintentional coopetition uncovered through the exploration of the OGI occurred between oil and gas servicing organisations. During the peak of the downturn in the industry, it was reported that the Oil and Gas Servicing Companies were tremendously affected, with some organisation's stock value falling as low as 53%. Hence, it is not surprising that these organisations need to pool resources to survive the harsh reality of the business environment. Therefore, the emergent coopetition that occurs among these companies fall within the 'coopetition as an adapting practice', which is the coopetition that is influenced by the external environment.

Although the exploratory study was used to answer this research question, one item in the quantitative measurement instrument sought to gain the perspective of the respondents about the likelihood of unintentional coopetition in the industry, and 41.5% of the respondents believe that these dynamic of IOR can occur in the industry. Thus, it can be assumed that owing to the competitive nature of the OGI, the current business environment, which has contributed to the uncertainties in the industry, organisations can cope by adopting coopetition.

Therefore, it can be concluded that, coopetition does occur both intentionally and unintentionally in the UK OGI. From the intentional perspective, the most common form of

coopetition that was observed is the partnering situation, while the adapting coopetition situation occurred unintentionally.

Since, it has also been found that network-level coopetition offers additional benefits to the performance of the sector, the OGI should encourage this form of alliance in the industry. Regulations, policies and incentives should be put in place to support this form of alliance.

The governance and management structures and its implications on the oil and gas industry would be discussed in subsequent sections.

8.3 GOVERNANCE STRUCTURE IN COOPETITION PERFORMANCE

Research Question

- *Q3.   How does the governance technique, affect coopetition performance in both deliberate and unintentional coopetition??*

It is worth noting that the governance mechanism relates to the control mechanism used to guide the alliance. It should also be noted that the governance here is concerned with the formation and implementation of the coopetitive alliance. To answer the research question, it was necessary first to uncover how these mechanisms (i.e. contracts and trust) impacts on deliberate coopetition.

From the exploration study of the OGI, it was found that while the respondents value the role and impacts of trust in the formation and implementation of coopetition in the industry, they agree that contractual agreements outranked trust. The respondents stressed the role and importance of trust in the formation phase of a coopetitive alliance. The respondents add that no organisation would risk engaging in coopetition with any party that does not have a good reputation or track record, which highlights the role and importance of experiential learning in coopetition.

Despite the acknowledgement of the role of trust in coopetition, the exploratory study found that because of the high regulation in the industry and the tremendous consequence of breaching any of the rules, organisations are very cautious when engaging in any IOR. Therefore, they found that, beyond the formation phase of coopetition, contractual agreements

should guide the relationships. This view was also mirrored in intentional as well as unintentional coopetition.

Therefore, to answer these questions, four hypotheses, which supports the positive effects of governance mechanism, were posed and accepted (at $p < .05$) in the quantitative study. The hypotheses were underpinned by the transactional cost theory, which supports the positive effects of contracts on the performance of IORs, the social capital theory which supports the positive impacts of trusts on the outcome of IORs.

- ***Hypothesis I(a)****: The effects of transactional governance (contracts) on intended coopetition performance is positive.*
- ***Hypothesis I(b)****: The effects of transactional governance (contracts) on unintended coopetition performance is positive.*
- ***Hypothesis II(a):*** *There is a positive relationship between relational governance (trust) and intended coopetition performance.*
- ***Hypothesis II(b):*** *There is a positive relationship between relational governance (trust) and unintended coopetition performance.*

[1]The results of the qualitative and quantitative study are similar, which shows that both transactional and relational governance is beneficial to the outcome of coopetition, regardless of the nature of its formation. The qualitative study shows that trust should be prioritised in the relationship formation phase, for example, while selecting coopetition partners, to ensure that the coopetition occurs in a trusting environment. However, a broad contractual agreement is also vital to lay down the expectations of each party as well as the consequences of every action in the alliance. This action can also strengthen the trust that exists in the industry.

Similarly, in emergent coopetition, the presence of trust, as well as contractual agreements, has been proven as beneficial to its performance. Therefore, this study agrees, that RBV and TCE should be considered in sequence in any organisational alliance. RBV should be considered with respect to the value an alliance can create for an organisation, and the TCE should be in place during the implementation of this alliance to reduce the chances of opportunism.

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[1] It should be noted that this study is not concerned with ranking the most suitable governance mechanism to be adopted in coopetition within the industry; instead, it focuses on its effects on the outcome of deliberate or emergent formation.

Therefore, to answer research question 3, the governance mechanism impacts the emergent and deliberate coopetition in the same manner. The study shows that both forms of governance mechanisms are equally as crucial in a coopetitive alliance, although, the qualitative research reveals that the relational governance should precede transactional governance, to create a more suitable setting for coopetition to occur in the alliance.

8.4 MANAGEMENT STRUCTURE IN COOPETITION

Managing a coopetition alliance is perhaps the most focal area of studies in the coopetition research. Several typologies and assertions have been made regarding the most effective and practical method of managing the complicated alliance due to the paradoxical nature of the alliance. Based on the review of literature, the study categorised coopetition management into two aspects, the practical method of managing the strategy and tension management. The outcome of the findings would be discussed further with respect to the research questions.

8.4.1 Dedicated Alliance Function in Coopetition Performance
Research Question

- *Q4: Does the use of a dedicated alliance function positively influence the outcome of intentional coopetition?*

This question relates to the use of strategic alliance team to manage the coopetition relationship. Coopetition has been viewed as a form of strategic alliance, as its benefits to the organisations have been established on a strategic level.

From the exploratory study, respondents agree that the management of coopetition seems complicated; however, all the respondents suggested that a dedicated team should be responsible for managing the alliance. Even though some respondents advocate for an independent third-party organisation such as management consulting firms to manage the interactions, this study agrees that this dynamic would create additional tensions.

The results of the exploratory study found that the development of an alliance team from within the collaborating organisations may offer some benefits to the relationship.

To extend this view, the study set out to investigate the role of strategic dedicated alliance team on the outcome of coopetition. Although the implications of a dedicated alliance team in IORs

has been vastly studied in the organisational literature, there are only limited studies that have reviewed its impact on a coopetitive endeavour.

The qualitative exploration showed that organisations are open to these form of coopetition management, stressing that the alliance team can vet the potential coopetition partners, would be strategic in forming and implementing relationship, and the experience of IO alliances can provide additional benefits in managing conflicts that arise from the relationship, which therefore reduces the chances of opportunism in the relationships.

According to Res_05, the complexities in the OGI is such that other organisations are at risk of unintentional knowledge leakage, since the industry is continuously striving for innovations, as such, a dedicated team would be skilled in sharing the relevant information to the coopetition partners without compromising the organisations' competitive advantage.

The qualitative study found that because an organisation has a dedicated alliance function, they are more aware of the dangers of IORs which makes them more inclined to adopt transactional governance mechanisms, especially in industries as volatile as the OGI although they recognised that relational governance is beneficial in the initiation aspect of the alliance.

Further exploration of the OGI, also found that these alliance teams are present in the industry and manage their inter-organisational relationships. It was found that one of the principal purposes of this alliance team is to ensure that every IOR is in line with the government and industry regulation, which seeks to curb anti-competitive interactions and avoid cartel-like interactions in the industry.

Since the dedicated alliance team is essential in planned IORs, this study empirically investigates its effects on the outcome of intended coopetition. To answer the research questions, five hypotheses were proposed. The first two hypotheses (a, b), seeks to find the relationship between the dedicated alliance function and the governance mechanisms. Hypothesis III(c), tries to uncover the relationship between the presence of a dedicated alliance function and the performance of intended coopetition.

- *Hypothesis III(a): There is a positive relationship between organisations that have a dedicated alliance function and the adoption of transactional governance.*
- *Hypothesis III(b): There is a positive relationship between organisations that have a dedicated alliance function, and the adoption of relational governance.*

- ***Hypothesis III(c):*** *The relationship between having a dedicated alliance function and the performance of intended coopetition is positive.*

The quantitative study found a positive correlation between the presence of a dedicated alliance function and the adoption of relational and transactional governance. While this result corroborates the qualitative research, which suggests that the dedicated alliance team increases the chances of adopting it the transactional governance structure (contracts) to control its alliances; it contradicts the exploration study which assumes that dedicated alliance team are less likely to implement relational governance. Nonetheless, the findings support the literature, as they identify that dedicated alliance teams influence the governance mechanisms, by providing formal control in a trusting environment to allow seamless coopetition.

Additionally, the quantitative analysis of this study found a positive correlation between the use of a dedicated alliance function and the outcome of intentional coopetition. This outcome is not surprising as several studies have proved that having a dedicated alliance function improves the outcome of IORs. This study, therefore, shows that this can be translated into coopetition and proves a practical implication for managing coopetition in industries.

To extend the understanding of the dedicated alliance function in improving the performance of coopetition, two additional hypotheses were proposed to try to explain how the governance mechanism influences the outcome of the intended coopetition in organisations that use dedicated alliance functions.

- ***Hypothesis III(c) ii.*** *Transactional governance mediates the positive effects of alliance function on intended coopetition performance.*
- ***Hypothesis III(c) iii.*** *Relational governance mechanism mediates the positive effects of alliance function on intended coopetition performance.*

The study found that transactional governance mechanism mediates the positive effects of dedicated alliance function on intended coopetition performance. However, there were no mediating effects as a result of relational governance. This, therefore, shows that a dedicated alliance function is more likely to have an increased chance of intended coopetition success if they utilise transactional governance. This finding is, therefore, consistent with the qualitative results that insist on dedicated alliances in the industry are more inclined to adopt transactional governance.

8.4.2 Tension Management in Coopetition

Research question

- *Q5: What are the effects of tension management capability on the outcome of unintentional coopetition by UK Oil and Gas Industry?*

As identified in the section above, the issue of tension management in coopetition management is crucial. The literature reveals that two tension management principles have been uncovered, i.e. the separation and integration principle. The exploratory study found that the separation paradox is the most prominent way to manage the coopetition tensions in the oil and gas industry.

From the outcome of the exploratory study, most respondents agree that for the tensions in coopetition to be appropriately managed, the separation principle should be adopted, since the alliance is already complicated. The organisations would require clarity about which phase of the partnership they are in and can take measures to manage these elements effectively. The study finds that the spatial separation typology was the management of the relationship is split and allocated to different management teams was preferred in the oil and gas industry. However, there are concerns that this form of separation could introduce intra-organisation tensions were each opposing team members perceive themselves as rivals.

Notwithstanding, the exploration showed that the separation typology is best suited for the industry due to the complexities, risks and high level of industrial regulations. They add that if the elements are separated, it becomes easy to identify any problem areas in the alliance.

Interestingly, several authors agree that tension management allows successful coopetition but can only be adopted when the parties are aware of the strategy they are engaged in deliberate coopetition. Studies have shown a positive correlation between the various forms of tension management and the performance of the IOR alliance. However, what remains unclear is how tension management affects the outcome of coopetition when the strategy is practised unintentionally. Since, there is expected to be a similar outcome, as such, it can be assumed that tension management can positively influence the performance of unintentional coopetition.

To answer the research question, three hypotheses were proposed. The first two hypotheses were conducted to observe if the separation tension management has any impacts on the governance mechanisms. This hypothesis was proposed to investigate if the ability to manage

tensions in a trusting or formally controlled environment has any effects on the performance of unintended coopetition.

- ***Hypothesis IV(a):*** *The relationship between adopting the separation principle of tension management and using a transactional governance mechanism to control the relationship is positive.*

- ***Hypothesis IV(b):*** *The relationship between adopting the separation principle of tension management and using a relational governance mechanism to control the relationship is positive.*

- ***Hypothesis IV(c):*** *The relationship between adopting the separation principle of tension management and successful unintended coopetition is positive.*

The quantitative findings found that separation tension management does not have a significant effect on both governance mechanisms. As such, this management method is specifically concerned with the elements of coopetition and not the governance technique adopted in the relationship. Notably, the third hypothesis is accepted, which shows that separating the opposing elements of coopetition can be beneficial to the outcome of emergent coopetition. Therefore, this result corroborates the qualitative study, which insists that the integration technique is too complex to be adopted in an already complex and heavily regulated industry such as the oil and gas industry. Additional hypotheses were proposed to explain the reason for the positive correlation between separation tension management and the performance of emergent coopetition. However, the absence of a significant relationship between tension management and governance mechanisms suggests that other unidentified factors may influence the relationship.

8.5 SUPPLY CHAIN FLEXIBILITY AND COOPETITION

Research Question

- *Q2: Does the flexibility of an organisation's supply chain, influence the outcome of coopetition?*

The question above seeks to uncover the relationship between the flexibility of a supply chain and the outcome of coopetition. It aims to investigate the effects of SCF on coopetition and its success. The qualitative study of this research found that coopetition and the willingness to engage in a coopetitive alliance was enhanced among organisations with flexible SC indicating that SCF is a coopetition enabler. The respondents not only highlighted the benefits of

coopetition on the flexibility and resilience of the SC but also agreed that a supply chain that focuses on coopetition would be not be opposed to engaging in a coopetitive relationship. The qualitative findings shows that coopetition can improve the efficiency of a supply chain in dealing with risks and disruptions in the organisation's supply chain, in a speedy manner.

Regarding the effects of SCF on coopetition performance, the qualitative study found that organisations that prioritise are more inclined towards adopting radical strategies to improve their competitive advantage. For instance, (Res_05), observed that when an organisation is primarily concerned with reducing disruptions and risks in their SC, they need to work closely with other organisations and would not mind adopting coopetition, if it is proven to improve the competitive standing of the organisation. Additionally, the study finds that the flexibility of a supply chain suggests that the organisation has a pool of verified suppliers that can make partner selection in coopetition easier and improve the trust that exists among the partners in the alliance, thus reducing the tensions in the relationship, which therefore leads to the success of the coopetition alliance. As a result, SCF has positioned through the qualitative study a coopetition enabler, such that the flexibility of a supply chain positively influence the likelihood of an organisation engaging in coopetition.

Another interesting finding with regards to SCF and coopetition is that to improve the organisational performance; a focal organisation can encourage its significant suppliers to engage in a coopetitive relationship, which is vertical coopetition. When organisations encourage collaboration and coopetition among their supplier's, it increases the rate of innovation, as these suppliers can find more beneficial ways of meeting the needs of their customers and therefore improve the performance of the focal organisation.

Therefore, the qualitative study finds that SCF beneficially impacts coopetition as it can be positioned as one of the enablers of the strategy. In addition, as a result of flexibility in SC, the focal organisation can encourage coopetition among its suppliers which can then improve the performance of the focal organisation. SCF is also beneficial for coopetition as the organisations can gain experiential learning about potential coopetition partners, and also obtain experiences with other external organisation.

To obtain more insight into the role of SCF in coopetition performance, the following hypotheses were proposed to be tested using quantitative analysis.

- ***Hypothesis V(a):*** *There is a positive relationship between organisations that have a flexible supply chain function, and the adoption of Transactional Governance (Contracts).*

- ***Hypothesis V(b):*** *There is a positive relationship between organisations that have a flexible supply chain function, and the adoption of Relational Governance (Trust).*

- ***Hypothesis V(c):*** *There is a positive relationship between organisations that have a flexible supply chain function, and the* outcome *of intended coopetition.*

- ***Hypothesis V(d):*** *There is a positive relationship between organisations that having a flexible supply chain function, and the outcome of unintended coopetition.*

The quantitative study rejected all hypothesis except hypothesis V(b). The research shows that SCF does not have any significant effect on the outcome of both intentional and unintentional coopetition. While the qualitative study finds that SCF can enable coopetition, the quantitative research shows that the flexibility of the supply chain does not have any significant influence on the outcome of the coopetition relationship. However, the accepted hypothesis V(b), finds a positive correlation between the flexibility of a supply chain and the adoption of relational governance. This finding is unsurprising since the flexibility of an organisation hinges on its ability to have a trusting and close relationship with other organisations in its network.

To further understand how SCF can influence coopetition outcome, the study investigates the interaction effects, which aim to uncover how the combined impact of SCF and dedicated alliance function and SCF and tension management has on the outcome of intentional and unintentional coopetition. The following hypotheses were proposed to answer the question.

- ***Hypothesis VI(a):*** *There is a positive relationship between the interacting effect of having a flexible supply chain and having a dedicated alliance function, and the outcome of unintended coopetition.*

- ***Hypothesis VI(b):*** *There is a positive relationship between the interacting effect of having a flexible supply chain and having a dedicated alliance function, and the outcome of intended coopetition.*

- ***Hypothesis VI(c):*** *There is a positive relationship between the interacting effect of having a flexible supply chain and the ability to manage tension, and the outcome of unintended coopetition.*

- ***Hypothesis VI(d):*** *There is a positive relationship between the interacting effect of having a flexible supply chain and the ability to manage tension, and the outcome of intended coopetition.*

From the quantitative analysis, no significant effects on the performance of coopetition were found from interacting the variables. These hypotheses (VI), confirms the above assumptions (V), suggesting the flexibility of the SC does not influence the outcome of coopetition. Whether or not the organisation has a dedicated alliance function or the ability to manage coopetition tensions, there are no significant effects to the coopetition performance.

Therefore, this study shows that the flexibility of the supply chain is essential to provide an initial push, such as enabling the organisations engage in coopetition. However, it does not offer any other significant benefits to the performance of the alliance, both as an intentional or unintentional strategy.

8.6 IMPLICATION AND RECOMMENDATION OF THIS STUDY FOR THE OIL AND GAS INDUSTRY

The findings in this study have practical implications for the oil and gas industry, in the areas of management and governance in inter-organisational alliances that occur in the industry, especially coopetition. The current business climate in the oil and gas industry as a result of the dwindling resources in the North Sea as well as the economic climate owing to Brexit, and the recent COVID-19 pandemic has brought about uncertainties in the industry. Despite the industry encouraging collaboration, the success of the collaborative efforts continue to decline. However, improvement can be made, both in terms of the willingness of the organisations to engage in inter-organisational relationships, especially coopetition and the rate of success in the alliance.

The intense rivalry in the industry explains organisations' hesitation to engage in collaboration and most forms of inter-organisational alliances, as they need to maintain their competitive advantage and avoid unnecessary knowledge leakage. However, with the government and industry regulatory bodies encouraging collaboration by providing incentives such as tax rebates, these organisations are now embracing collaboration and their associated benefits.

Nonetheless, the collaboration adoption and success rate, suggests that an IOR that considers the rivalry in the industry may be a more suitable strategy to improve the productivity in the industry. Through the exploration of the sector, it was uncovered that the organisations are

concerned about risks which can arise from collaboration. This suggests that coopetition may be a more suitable strategy as it considers the rivalry in the industry. Additionally, since it has been established that the business environment influences the adoption of the emergent strategy, the practice of coopetition was observed occurring as an unintentional strategy, which suggests that efforts need to put in place, to ensure organisations are effectively adopting the strategy to avoid additional risks and uncertainties in the industry. The application of this strategy may prove beneficial to the industry since it is a hybrid of both collaborations which is the industry recommended way to improve productivity in the industry and competition which is the characteristic of the sector.

The organisations in the industry are aware of the benefits of coopetition and realise that if properly executed may provide more advantages to the industry, (which includes increasing the speed of operations and increasing innovativeness); as the parties involved in the coopetition relationship are aware of the risks in the alliance and as such can have protective measures in place to protect their capabilities and retain their competitive advantage. However, most organisations would not consider adopting coopetition because of legal concerns in the highly regulated industry. Therefore, for organisations to become more open to the idea of coopetition in the industry, the regulatory bodies need to encourage the operators to engage in the hybrid relationship by providing incentives and practical guides to limiting the risks in the relationship. Although, the practice of coopetition is not new in the industry, with examples of coopetition occurring at the network level; its application can extend beyond standardisation in the industry, where operators engage in the relationship to ensure that suppliers meet a specific requirement. Coopetition can also be useful to improve the operation of individual organisations. One of the hindrances to the adoption of coopetition, observed through the exploration of the industry is the lack of examples within the industry and organisations assume the strategy is not necessary. To address these reservations, the regulatory bodies should invest in providing an example of inter-organisational coopetition by helping to monitor a relationship from inception to completion and introducing policies and industrial practices to assist organisations successfully engage in coopetition; especially regarding risks, knowledge sharing and issues with anti-competition. Additionally, incentives can be offered to organisations willing to participate in the coopetition, such as tax rebate, to encourage organisations to engage in the process.

This study also finds that since the industry is mostly competitive, the industries are more inclined to strictly adopt contracts as the governance mechanism in any coopetition endeavour.

While this research, through the quantitative and qualitative study, finds that the contracts are an effective means of governance, trusts in the relationships should not be disregarded. Trusts can be adopted in the coopetition pre-formation phase, in selecting partners and deciding the activities to collaborate and determining the way the relationship would exist. Essentially, this study finds more coopetition success both intentionally and unintentionally can be attained if the trust and contracts governance mechanisms are adopted as complementary strategies as opposed to substitutes. The exploration of the industry finds that organisations are distrustful of their competitors which are expected; however, several benefits can be realised from working together, and the presence of trusts creates an enabling environment for the relationship to thrive. Thus, trust must be considered when deciding on potential coopetition partners, and a trusting relationship should be developed as the relationship progresses.

Therefore, the need for contractual agreements to protect the organisations against risks and uncertainties in the industry becomes necessary. Owing to the complexity in the OGI, an extensive contract, which clearly states the roles, expectations and consequences of any breach in the alliance should be made and enforced throughout the relationship, to protect the interest of all parties involved in the interaction.

With regards to the management of the coopetition relationship, this study corroborates several studies in alliance management that dedicated alliance function improves the performance of IORs. Both the qualitative and quantitative study of this research finds that having a dedicated alliance function within the organisations in the coopetition relationship improves its chances of success. Therefore, OGCs interested in adopting this strategy should invest in setting up a strategic alliance function to allow the proper management of the alliances. The alliance team should include professionals competent in legal issues, conflict management, communication management, partner selection, relationship assessment and knowledge sharing. This team would ensure that all the needs of the organisations with regards to the IORs are met and any issues can be identified and addressed as the relationship progresses. To reduce the tensions in the coopetitive relationship, a dedicated team can be selected from within the dedicated alliance function of each partner in the coopetition interaction to manage a specific coopetition project.

An interesting finding from this study is that the contractual agreements help explain the improvement in intentional coopetition performance as a result of having a dedicated alliance function. The dedicated alliance function is known to select an appropriate governance mechanism for IORs; as such, this study shows that using contracts as a governance technique

increases the chance of intentional coopetition success. It is worth noting that there was a positive correlation between dedicated function and both contracts and trusts, which further proves the stance discussed above, that both contracts and trusts should be treated as complementors. However, more attention should be paid to ensuring that extensive contracts are in place to protect the organisations in the relationship.

Based in the findings, organisations should ensure that they have an active alliance function managing all the alliances they engage in, the alliance function should, in turn, ensure that they engage in IORs with other organisations that have a dedicated alliance function. In the pre-formation phase of the relationship, the parties involved in the relationship should form a management team from within the dedicate alliance team to manage to coopetition relationship. This team should also be responsible for creating a contractual agreement to govern the interaction, the management of knowledge and information sharing to ensure that there are no accidental knowledge leakage, conflicts resolution, to mitigate any conflicts that arise from the interaction and also to manage the tensions in the coopetition that occurs intentionally.

With regards to emergent coopetition, the capability of the parties involved in the relationship to manage the inherent tension in the strategy is essential to a successful performance. The qualitative study found that organisations prefer to use the separation principle to address the tension in the coopetition relationship, where the cooperative and competitive phases of the relationship are managed separately. Similarly, the quantitative study uncovered that separating these elements positively impacts on the performance of unintentional coopetition. However, if the organisations are unaware of the strategy being adopted, particularly a strategy as complex as coopetition, it would be difficult to separate these elements. This study, therefore, highly recommends a dedicated alliance team to manage any inter-organisational interactions. The alliance team should, in turn, define and separate all the major phases and elements involved in any of their alliances. Separating elements of all IO interactions would give the organisations the capacity to manage IO tensions which would, therefore, translate to coopetition success. The ability to separate the elements in IORs would allow easier management of the tensions in the relationship, especially coopetition.

This study shows that for coopetition success to be attained, the OGI needs to encourage the use of a dedicated alliance team within the industry to manage interactions that occur outside the organisation. The purpose of this team would ensure that the correct strategy is adopted, and a suitable governance mechanism is used to guide the relationships. Additionally, all

phases of and elements of any inter-organisational alliance needs to be clearly laid out to ensure that each party is aware of the nature of the partnership to allow a successful endeavour. The qualitative study showed that the co-management could provide a beneficial way of managing the tensions that arise in coopetition within the industry.

It was observed from the study that the organisations are aware of the benefits coopetition can add to their SC, including, making their SC more resilient, improving the speed of operations etc. The qualitative finding in this study shows that having a flexible supply chain enhances the willingness and performance of coopetition in the industry. The respondents suggest that organisations that prioritise flexibility in their SC are open to adopting strategies that would help maintain their SC performance to maintain their competitive advantage. Therefore, the OGI can focus on organisations that focus on flexibility to provide an industry-wide example of coopetition for other organisations to adopt. Even though the quantitative study did not find any significance between the flexibility of an SC and the performance of coopetition, there is evidence that organisations who value flexibility are more inclined to trust its coopetition partners, which implies that they would be willing to engage in coopetition.

The process map in Figure 8.1 below is a recommendation for organisations in the industry willing to engage in coopetition. This study shows that a dedicated alliance team should be in place prior to IORs in the industry. Hence, the relevant departments needing interaction with other organisations need to work closely with the alliance team to determine the what functions the organisations can collaborate with other firms with, based on the proximity to the customers. From earlier discussions, it was observed that coopetition is preferable further away from the end-users, however, since the OGI is complex, the core competency of the organisation should be considered and protected in all alliances. In selecting suitable coopetition partners, the coopetition space to be considered to ensure a healthy balance between the need to collaborate and cooperate, to limit the risks of opportunism and knowledge leakage which can cost an organisation its competitive advantage. Power asymmetric and dependency are other factors to consider when selecting partners, there should be a balance, such that no organisation depends too much on another organisation, or one organisation having too much power. This would ensure that the organisations have a healthy environment to cooperate in, where the risks in the relationship are limited.
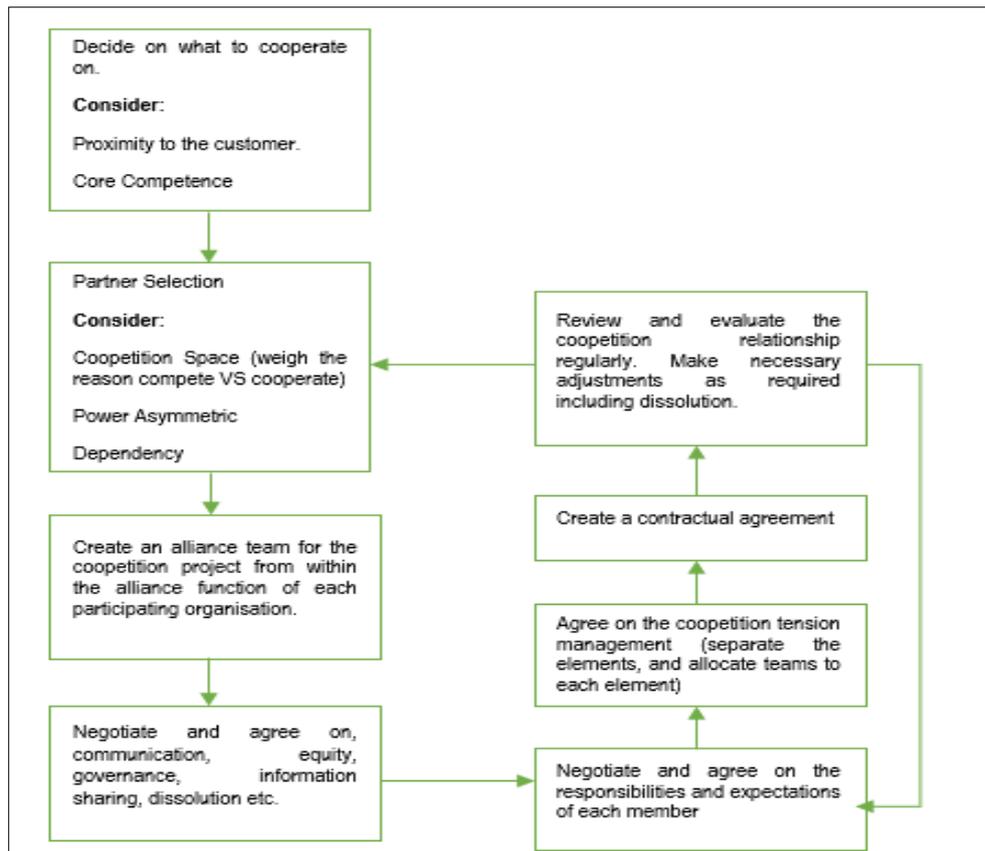
Figure 8.1: Framework for Implementing Coopetition

Once partners have been selected and vetted, a management team should be created from within the participating organisations, to negotiate the necessary terms of the alliance including the governance, means of communication and knowledge sharing etc. all the conditions agreed should be written out to help form the terms of the contracts. As mentioned above, all elements of the interactions should be spatially separated to allow easier management of the tensions in the relationship. Importantly, all members of the coopetition alliance should agree to a contract, which would guide the interactions.

8.7 CONTRIBUTIONS FROM THIS STUDY

This study has made significant contributions to the emerging subject of coopetition, both as a practice and research. The key contributions would be discussed in three categories, conceptual, empirical and methodological.

This study contributed to the conceptual understanding of coopetition, by creating a framework to access the factors that can lead to a successful coopetition performance both as an intentional strategy and coopetition that occurs unintentionally. Unintentional coopetition has mainly been ignored in coopetition studies, with many researchers focusing on the success factors, antecedents, outcomes etc of intentional coopetition. Based on Mintzberg and Water's (1985)'s theory of emergent strategies, this study shows that management and governance of intentional coopetition can also be used in unintentional coopetition to achieve a similar outcome.

Following the development of the conceptual model, this study contributes empirically to the study of coopetition by obtaining data from the OGI to support the conceptual framework. The data gathered was analysed using structural equation modelling, to test the fitness of the research model to the data, which confirmed the goodness of the overall model and framework including the individual relationships in the model. Based on the confirmatory analysis, research conclusions and recommendations applicable both in the OGI and coopetition in other industries, regarding the management and governance of intentional and unintentional coopetition.

Methodologically, this research contributes additional measurement items to test for intentional, unintentional coopetition and the inherent tensions in the alliance. The study, using both existing literature and the outcome of the qualitative research, developed measures to test for tensions management, unintentional coopetition performance and included additional items to test for intentional coopetition. To test the reliability of the items, a Cronbach alpha test was conducted on the items to ensure the questions are fit for purpose. Additionally, the research utilises structural equation modelling to test the overall model, the individual direct relationships as well as indirect relationships such as the moderation and mediating relationships in the model. The advantage of this method over the regression or multiple regression methods which is usually adopted in coopetition studies is that the strength of the relationship including the total, indirect, direct, and isolated relationships can be estimated in a single comprehensive framework.

8.8 SIGNIFICANCE OF THIS STUDY

Following the discussion about the conceptual, empirical and methodological contribution of this study; this section highlights the significance of the study.

First, this study updates the management literature on coopetition, collaboration and other related management constructs. In order to identify the knowledge gaps, an extensive and holistic literature review was done on themes relating to coopetition, its typologies, current trends. Additionally, the existing literature regarding the OGI was reviewed to uncover the current state of the industry.

The outcome of this study is significant to the UK Oil and Gas Industry. Besides the updated literature, this study develops a guideline for success coopetition implementation in the OGI. The OGI can adopt this framework to update their policies on collaboration. The study highlights the concerns of the OGCs towards engaging in both collaborative and coopetitive relationships. Therefore, the results of this study can be adopted by the regulatory bodies, to address some of these concerns, and also put some measures in place to make collaboration more attractive to the companies. Addressing these measures can, therefore improve the performances and productivity in the sector.

Similarly, this study provides a guideline for organisations willing to engage in coopetitive relationships. It highlights the critical governance and management techniques, discusses essential antecedents of coopetition that can foster successful coopetition alliances. Following the framework developed in these studies, positions organisations to obtain a competitive advantage. Obtaining a competitive edge is even more beneficial at a time such as this, given the current state of the industry, owing to Brexit, and the covid-19 pandemic, which has resulted in a disruption of the industry. Although the BP Statistical Review (2020), found that there was a 1.3% growth in energy consumption, it represents less than half of the growth in 2018. Similarly, Accentures (2019), OGA (2019) OGUK (2020), have all stressed that the industry is experiencing a downturn and radical solutions need to be adopted to ensure organisations are able to survive this difficult time. An effective application of the coopetition framework developed in this study can provide organisations with the required competitive edge.

8.9 LIMITATIONS OF THIS STUDY

Although this study provided some positive contributions which have been outlined above, there were several limitations to the study, described below, which can be addressed in future studies.

Firstly, the empirical study would have been significantly enhanced if SC professionals that had first-hand experience with the coopetition strategy were sampled, as opposed to SC

professionals with IOR experience. However, due to the complexities and rivalry in the industry, participants that fit the criteria could not be identified. Likewise, identifying several organisations within the industry that have engaged in any form of IOR with their competitors would have allowed the study to investigate the occurrence of coopetition, which would have been beneficial for the study. Due to the restrictions, the survey, both quantitative and qualitative applied strict criteria for selecting the research participants, to ensure that the respondents had the basic knowledge of how relationships outside the organisations worked. Three cut-off questions were included in the questionnaires, based on the extent of involvement in the SC function, the length of SC work experience, and their IOR experience. The qualitative interviews adopted a purposive sampling technique to ensure that all respondents had a significant IOR experience and a minimum of seven years of work experience.

Moreover, the uniqueness of the OGI, suggests that the outcome of this study may not be applicable with other less complex industries such as manufacturing, where the IORs may be more straightforward. However, the underlying theories adopted in the model, such as the TCE is relevant in many industries, therefore the model may be applied in more than the OGI. Additionally, the study can be enhanced through a model verification. Due to time constraint, the model could not be verified within the OGI industry.

Another limitation experienced in this study was the lack of formal database or avenue to reach the SC professionals. The absence of this database suggests that the sampling process was not entirely a random sampling and was not strictly formal. Therefore, the sampling approach adopted both convenience and random sampling, to individual select participants for the study which may have introduces selection bias and social desirability bias in the study. However, these biases were accounted for and statistically corrected in the study. The study found that the convenience sampling method was more beneficial in terms of participation than directly contacting the organisations from the sampling frame. Even though, manually searching and contacting respondents was time-consuming and not straight forward, there was no better approach to reach the participants in an ethical manner.

Additionally, the use of social media to source research participants introduces social desirability bias to the study. Since the profiles on LinkedIn are not verified, it becomes impossible to vet the respondents' organisations and actual job roles. For instance, some of profiles could have been fictitious or some of the job roles exaggerated, to allow the respondents to become more socially desirable. Fortunately, LinkedIn allows other users

recommend and verify the skill sets of users within the same network. Therefore, to reduce the rate of P bias, profiles that were the SC skillset had been recommended by other LinkedIn users were contacted for the study. The CMB, discussed above, was also used to account for and statistically correct the bias, which may have occurred as a result of the respondent selection process.

Furthermore, using a web-based survey method, it was difficult to ascertain the response rate. Although, the study was able to manually estimate the response rate, based on the number of invitations sent out and the number of completed questionnaires received, it was impossible to determine those who started but failed to complete the survey. Despite this limitation, the web-based platform offered more advantages for this study than any other survey approach.

8.10 RECOMMENDATIONS FOR FUTURE RESEARCH

Based on the limitations of this study, some suggestions for future coopetition studies are provided below:

1. Additional studies should be conducted, using organisations that have engaged in coopetition as case studies. More importantly, the study should investigate the occurrence of coopetition within organisations in an ongoing coopetitive relationship, from inception to completion. The necessary factors in place that enabled the relationship, the nature of management and the governance that was adopted and their rate of success, the rate in which the relationship is reviewed, how resources and information and shared among the participants, the extent of value creation and appropriation in the relationship etc. The review would allow a more extensive guide for coopetition within the industry, by identifying pitfalls and critical success factors, as well as a guide to dissolving the relationship. Additionally, the co-management technique of managing the tensions in coopetition relationships should be examined. Moreover, coopetition relationships which may have occurred unintentionally should be identified critically reviewed to identify and outline any differences from intentional coopetition, which would allow organisations recognise signs of unintentional coopetition and adjust the relationship as required.

2. Another recommendation for future studies is the validation/verification of the model. As mentioned above, due to time constraints, the model could not be verified, therefore, a model verification may be beneficial to the understanding of coopetition. The elements identified, i.e. tension management, dedicated alliance function, trust and

contracts, should be investigated to confirm the nature of relationship that exists amongst the constructs in terms of the performance of intentional and unintentional coopetition. The model can also be tested and verified in other industries to test its applicability in other sectors.

3. This study focused on the impacts of SCF on coopetition performance. Future studies can advance the understanding of coopetition by investigating the reason, the flexibility of a supply chain does not significantly influence the outcome of coopetition. Alternatively, other studies can be conducted to investigate how the nature of an organisations' supply chain can impact on the performance of coopetition.

4. From a sampling viewpoint, additional studies can be conducted using participants that have been actively involved in a coopetitive relationship as study respondents. The participants can be sourced from within organisations that have engaged in a coopetition project.

8.11 SUMMARY

The purpose of this chapter was to put the research findings into context, based on the existing literature. It also aimed to discuss the answers to the research questions which the study set out to investigate. Hence, the findings from the qualitative research (chapter 5) and the quantitative analysis (chapter 7), were discussed within the context of coopetition and IO studies. Additionally, the section provided implications for the UK Oil and Gas Industry, which was the case study used in the research.

The study found that coopetition can provide significant benefits for the OGI. The study also uncovered some evidence of unintentional coopetition in the industry. However, the fear of breaching the regulation in the industry and acquiring unnecessary legal issues without being offered any incentives has made some of the organisation wary of engaging in this form of inter-organisational relationship. Additionally, the study found that the current role of coopetition in the industry is to create policies and regulations for the industry, such as regulating the sizes of various equipment to hasten operations. Although the study found limited examples of intentional coopetition in the industry, there were some instances of unintentional coopetition. To encourage coopetition in the industry, the sector should invest in providing an industrial guide to engaging in coopetition, by studying the occurrence and management of the strategy in the industry and the success factors.

The issue of trust and contracts have been a source of debate in management literature, including coopetition studies. While some authors believe that trust and contracts are alternative control mechanisms, such that the presence of both can have a negative impact on the relationship. For example, having a contractual agreement can dampen the trust in an inter-organisational relationship. However, others believe that these mechanisms are complementors, where the presence of contracts and trust is beneficial for the advancement and the performance of the relationship. Through the analysis of the empirical studies, this research shows the both trust and contracts are vital for improving the performance of coopetition relationships, both as an intentional and unintentional strategy and can be treated as complementors as opposed to alternatives. This advances the knowledge of coopetition, as the importance of contractual agreements have been overlooked in coopetition studies.

The management of coopetition has been a major issue in the understanding of the complex strategy. The benefit of using dedicated alliance function in managing IORs have been established in management studies. Although the effects of this function on the outcome of coopetition was yet to be investigated. This quantitative study shows that using dedicated alliance function to manage coopetition can improve the performance of the alliance, the stance was also corroborated by the qualitative study where the participants agree that the dedicated alliance function can help improve the performance and outcome of a coopetition relationship. An interesting finding from the study also found that the use of contractual agreements, partially explains the improved performance of the relationship. This suggests that contractual agreements in OGI should be ranked above the trust in relationships outside the organisation.

The qualitative study uncovers that separating the elements of coopetition is a more practical way to manage the tensions in a coopetition study, this stance was further corroborated by the quantitative study which found a significant correlation between adopting the separation technique and a positive coopetition performance, for emergent coopetition. Studies in coopetition show that using the separation technique may introduce additional tensions in the relationship. However, using a dedicated alliance function along with the separation technique of tension management would be helpful in ensuring a successful coopetition outcome.

From the supply chain viewpoint, the study shows that while coopetition is beneficial to the flexibility of a supply chain, SCF has limited impacts on the outcome of the alliance, beyond being an enabler of the relationship. The study shows that the organisations that prioritise flexibility in their supply chain are more inclined to adopt the coopetition strategy. Therefore,

supply chain flexibility can become one of the factors considered when selecting potential partners in for a coopetition project.

Having presented and discussed the key findings and its practical implications for organisations as well as management studies, the chapter outlined the contributions of the study and its limitations. Subsequently, recommendations for future studies were highlighted based on the research limitations.

REFERENCES

AAKER, D.A., KUMAR, V. and DAY, G., 1998. Marketing Research. New York: John Wiley& Sons.

ABDALLAH, F. andWADHWA, A., 2009. Collaborating with your Rivals: Identifying Sources of Competitive Performance. *DRUID Conference.*

ACHA, V., 2000. The role of technological capabilities in determining performance: the case of the upstream petroleum industry. *The DRUID conference of industrial dynamics, Hillerφd.*

AFUAH, A., 2009. *Strategic innovation: new game strategies for competitive advantage.* Routledge.

AGOSTINI, L. and NOSELLA, A., 2017. Interorganizational relationships in marketing: A critical review and research agenda. *International Journal of Management Reviews,* 19(2), pp. 131-150

AGOSTINI, L., NOSELLA, A. and TESHOME, M.B., 2019. Inter-organizational relationships: toward a reconceptualization of constructs. *Baltic Journal of Management,* 14(3), pp. 346-369

AHLSTRÖM-SÖDERLING, R., 2003. SME strategic business networks seen as learning organizations. *Journal of Small Business and Enterprise Development,* 10(4), pp. 444-454

AHUJA, G., 2000. Collaboration networks, structural holes, and innovation: A longitudinal study. *Administrative Science Quarterly,* 45(3), pp. 425-455

AHUJA, G., 2000. The duality of collaboration: Inducements and opportunities in the formation of interfirm linkages. *Strategic Management Journal,* 21(3), pp. 317-343

AKPINAR, M. and VINCZE, Z., 2016. The dynamics of coopetition: A stakeholder view of the German automotive industry. *Industrial Marketing Management,* 57, pp. 53-63

ALBERS, S. and SCHWEIGER, B., 2011. Network-Based Competition–Antecedents, Forms and Research Implications. *5th International Conference on Economics and Management of Networks, December.*

ALI, A., MAHFOUZ, A. and ARISHA, A., 2017. Analysing supply chain resilience: integrating the constructs in a concept mapping framework via a systematic literature review. *Supply Chain Management: An International Journal,* 22(1), pp. 16-39

ALVESSON, M. and KÄRREMAN, D., 2007. Constructing mystery: Empirical matters in theory development. *Academy of management review,* 32(4), pp. 1265-1281

AMOAKO-GYAMPAH, K. et al., 2019. Supplier relationship management and firm performance in developing economies: A moderated mediation analysis of flexibility capability and ownership structure. *International Journal of Production Economics,* 208, pp. 160-170

ANAND, B.N. and KHANNA, T., 2000. Do firms learn to create value? The case of alliances. *Strategic Management Journal,* 21(3), pp. 295-315

ANAND, B.N. and KHANNA, T., 2000. The structure of licensing contracts. *The Journal of Industrial Economics,* 48(1), pp. 103-135

ANDERSON, C.R. and ZEITHAML, C.P., 1984. Stage of the product life cycle, business strategy, and business performance. *Academy of Management journal,* 27(1), pp. 5-24

ANDERSON, E. and JAP, S.D., 2005. The dark side of close relationships. *MIT Sloan Management Review,* 46(3), pp. 75

ANDERSON, J.C. and GERBING, D.W., 1988. Structural equation modeling in practice: A review and recommended two-step approach. *Psychological bulletin,* 103(3), pp. 411

ANDERSON, J.C., HÅKANSSON, H. and JOHANSON, J., 1994. Dyadic business relationships within a business network context. *Journal of Marketing,* 58(4), pp. 1-15

ANDERSON, J.C. and NARUS, J.A., 1991. Partnering as a focused market strategy. *California management review,* 33(3), pp. 95-113

ANDRIOPOULOS, C. and LEWIS, M.W., 2009. Exploitation-exploration tensions and organizational ambidexterity: Managing paradoxes of innovation. *Organization science,* 20(4), pp. 696-717

ARBUCKLE, J., 2008. *Amos 17.0 user's guide.* SPSS Inc.

ARBUCKLE, J., 2016. *IBM® SPSS® Amos™ 24 user's guide. [On-line],*

ARIÑO, A. and RING, P.S., 2010. The role of fairness in alliance formation. *Strategic Management Journal,* 31(10), pp. 1054-1087

ARMENIA, S. et al., 2018. Marketing competition on a new product introduction–a structural analysis using systems thinking. *International Journal of Markets and Business Systems,* 3(2), pp. 141-162

ASTLEY, W.G. and FOMBRUN, C.J., 1983. Collective strategy: Social ecology of organizational environments. *Academy of management review,* 8(4), pp. 576-587

AXELROD, L., 1994. Balancing personal needs with environmental preservation: Identifying the values that guide decisions in ecological dilemmas. *Journal of Social Issues,* 50(3), pp. 85-104

AXELROD, R. and HAMILTON, W.D., 1981. The evolution of cooperation. *Science (New York, N.Y.),* 211(4489), pp. 1390-1396

AYRES, L., KAVANAUGH, K. and KNAFL, K.A., 2003. Within-case and across-case approaches to qualitative data analysis. *Qualitative health research,* 13(6), pp. 871-883

BABBIE, E. & MOUTON, J., 2008. *The practice of social research.* 8th ed. Cape Town: Oxford University Press.

BABBIE, E., 2010. The Practice of Social Research-12. *Belmont: Wadsworth,*

BABBIE, E., 2011. The basics of social research Belmont. *USA: Wadsworth, Cengage Learning,*

BABBIE, E.R., 2011. *Introduction to social research.* Wadsworth Cengage learning.

BAGOZZI, R.P. and YI, Y., 2012. Specification, evaluation, and interpretation of structural equation models. *Journal of the academy of marketing science,* 40(1), pp. 8-34

BAGSHAW, M. and BAGSHAW, C., 2001. Co-opetition applied to training-a case study. *Industrial and Commercial Training,* 33(5), pp. 175-177

BAKER, W.E. and FAULKNER, R.R., 2017. Interorganizational networks. *The Blackwell companion to organizations,* pp. 520-540

BAKSHI, N. and KLEINDORFER, P., 2009. Co-opetition and investment for supply-chain resilience. *Production and Operations Management,* 18(6), pp. 583-603

BALL, C., 2009. What is transparency? *Public Integrity,* 11(4), pp. 293-308

BAMFORD, J., GOMES-CASSERES, B. and ROBINSON, M., 2004. Envisioning collaboration: Mastering alliance strategies.

BARBOUR, R.S., 2014. Analysing focus groups. *The SAGE handbook of qualitative data analysis*, pp. 313-326

BARNEY, J., 1991. Firm resources and sustained competitive advantage. *Journal of management,* 17(1), pp. 99-120

BARNEY, J.B., 1986. Strategic factor markets: Expectations, luck, and business strategy. *Management science,* 32(10), pp. 1231-1241

BARNEY, J.B., 2012. Purchasing, supply chain management and sustained competitive advantage: The relevance of resource-based theory. *Journal of Supply Chain Management,* 48(2), pp. 3-6

BARNEY, J.B. et al., 2017. Management and organization review special issue 'Coopetition and innovation in transforming economies'. *Management and Organization Review,* 13(1), pp. 201-204

BARON, R.M. and KENNY, D.A., 1986. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology,* 51(6), pp. 1173

BARRIOS, M. et al., 2011. Response rates and data quality in web and mail surveys administered to PhD holders. *Social Science Computer Review,* 29(2), pp. 208-220

BARUCH, Y. and LIN, C., 2012. All for one, one for all: Coopetition and virtual team performance. *Technological Forecasting and Social Change,* 79(6), pp. 1155-1168

BAUMARD, P., 2009. An asymmetric perspective on coopetive strategies. *International Journal of Entrepreneurship and Small Business,* 8(1), pp. 6-22

BAZELEY, P. and JACKSON, K., 2013. *Qualitative data analysis with NVivo.* Sage Publications Limited.

BENGTSSON, M., ERIKSSON, J. and AND WINCENT, J., 2010. Co-opetition dynamics – an outline for further inquiry, competitiveness review. *International Business Journal,* 20(2), pp. 194-214

BENGTSSON, M., HINTTU, S. and KOCK, S., 2003. Relationships of cooperation and competition between competitors. *19th annual IMP conference.*

BENGTSSON, M. and JOHANSSON, M., 2014. Managing coopetition to create opportunities for small firms. *International Small Business Journal,* 32(4), pp. 401-427

BENGTSSON, M. et al., 2013. A systematic review of coopetition: levels and effects on different levels.

BENGTSSON, M. and KOCK, S., 1999. Cooperation and competition in relationships between competitors in business networks. *Journal of Business & Industrial Marketing,* 14(3), pp. 178-194

BENGTSSON, M. and KOCK, S., 2000. " Coopetition" in business Networks—to cooperate and compete simultaneously. *Industrial marketing management,* 29(5), pp. 411-426

BENGTSSON, M. and KOCK, S., 2014. Coopetition—Quo vadis? Past accomplishments and future challenges. *Industrial Marketing Management,* 43(2), pp. 180-188

BENGTSSON, M. et al., 2016. Coopetition research in theory and practice: Growing new theoretical, empirical, and methodological domains. *Industrial Marketing Management,* 57, pp. 4-11

BENGTSSON, M. and RAZA-ULLAH, T., 2016. A systematic review of research on coopetition: Toward a multilevel understanding. *Industrial Marketing Management,* 57, pp. 23-39

BENGTSSON, M., RAZA-ULLAH, T. and VANYUSHYN, V., 2016. The coopetition paradox and tension: The moderating role of coopetition capability. *Industrial Marketing Management,* 53, pp. 19-30

BENGTSSON, M. et al., 2010. Co-opetition dynamics–an outline for further inquiry. *Competitiveness review: An international business journal,*

BENJAMIN GOMES-CASSERES, 1996. *The alliance revolution: The new shape of business rivalry.* Harvard University Press.

BENTLER, P.M. and SATORRA, A., 2010. Testing model nesting and equivalence. *Psychological methods,* 15(2), pp. 111

BERNARD, H.R. and BERNARD, H.R., 2013. *Social research methods: Qualitative and quantitative approaches.* Sage.

BERNSTEIN, E., 2014. The transparency trap. *Harvard business review,* 92(10), pp. 58-66, 121

BERTRAM, D., 2009. Likert scales [Topic report]. *The Faculty of Mathematics University of Belgrad,*

BIGLIARDI, B., COLACINO, P. and DORMIO, A.I., 2011. Innovative characteristics of small and medium enterprises. *Journal of technology management & innovation,* 6(2), pp. 83-93

BOGNER, A., LITTIG, B. and MENZ, W., 2009. *Interviewing experts.* Springer.

BOLLEN, K.A. and DAVIS, W.R., 2009. Causal indicator models: Identification, estimation, and testing. *Structural Equation Modeling: A Multidisciplinary Journal,* 16(3), pp. 498-522

BOLLEN, K.A. and DAVIS, W.R., 2009. Two rules of identification for structural equation models. *Structural Equation Modeling: A Multidisciplinary Journal,* 16(3), pp. 523-536

BONEL, E. and ROCCO, E., 2007. Coopeting to survive; surviving coopetition. *International Studies of Management & Organization,* 37(2), pp. 70-96

BONG, K.H., PARK, J. and KIM, J.Y., 2018. A Study on the Effect of Technology Collaboration on Innovation Performance of SMEs: From the Views of Resource-based Theory. *Journal of Technology Innovation,* 26(3), pp. 98-128

BORYS, B. and JEMISON, D.B., 1989. Hybrid arrangements as strategic alliances: Theoretical issues in organizational combinations. *Academy of management review,* 14(2), pp. 234-249

BOUNCKEN, R.B., CLAUß, T. and FREDRICH, V., 2016. Product innovation through coopetition in alliances: Singular or plural governance? *Industrial Marketing Management,* 53, pp. 77-90

BOUNCKEN, R.B. and FREDRICH, V., 2012. Coopetition: performance implications and management antecedents. *International Journal of Innovation Management,* 16(05), pp. 1250028

BOUNCKEN, R.B., FREDRICH, V. and KRAUS, S., 2019. Configurations of firm-level value capture in coopetition. *Long range planning,*

BOUNCKEN, R.B. et al., 2018. Coopetition in new product development alliances: advantages and tensions for incremental and radical innovation. *British Journal of Management,* 29(3), pp. 391-410

BOUNCKEN, R.B. et al., 2015. Coopetition: a systematic review, synthesis, and future research directions. *Review of Managerial Science,* 9(3), pp. 577-601

BOUNCKEN, R.B. and KRAUS, S., 2013. Innovation in knowledge-intensive industries: The double-edged sword of coopetition. *Journal of Business Research,* 66(10), pp. 2060-2070

BOUNCKEN, R.B. et al., 2016. Entrepreneurial orientation in vertical alliances: joint product innovation and learning from allies. *Review of Managerial Science,* 10(2), pp. 381-409

BOUNCKEN, R. and ASLAM, M.M., 2019. Understanding knowledge exchange processes among diverse users of coworking-spaces. *Journal of Knowledge Management,*

BOVET, D. and MARTHA, J., 2000. Value nets: reinventing the rusty supply chain for competitive advantage. *Strategy & leadership,* 28(4), pp. 21-26

BOYACI, T. and GALLEGO, G., 2004. Supply chain coordination in a market with customer service competition. *Production and operations management,* 13(1), pp. 3-22

BRADACH, J.L. and ECCLES, R.G., 1989. Price, authority, and trust: From ideal types to plural forms. *Annual review of sociology,* 15(1), pp. 97-118

BRADENBURGER, A.M. and NALEBUFF, B.J., 1996. Co-opetition. *Nova Iorque: Currency Doubleday,*

BRANDENBURGER, B. and NALEBUFF, B., 1995. The right game: use game theory to shape strategy. *Harvard Business Review,* 73(4), pp. 57-71

BRANNEN, J., 2005. Mixing methods: The entry of qualitative and quantitative approaches into the research process. *International journal of social research methodology,* 8(3), pp. 173-184

BRASS, D.J. et al., 2004. Taking stock of networks and organizations: A multilevel perspective. *Academy of management journal,* 47(6), pp. 795-817

BRESSER, R.K. and HARL, J.E., 1986. Collective strategy: vice or virtue? *Academy of management review,* 11(2), pp. 408-427

BREWER, J. and HUNTER, A., 1989. *Multimethod research: A synthesis of styles.* Sage Publications, Inc.

BREZNITZ, D., 2007. Industrial R&D as a national policy: Horizontal technology policies and industry-state co-evolution in the growth of the Israeli software industry. *Research Policy,* 36(9), pp. 1465-1482

BRINKHOFF, A., ÖZER, Ö. and SARGUT, G., 2015. All you need is trust? An examination of inter-organizational supply chain projects. *Production and operations management,* 24(2), pp. 181-200

BROLOS, A., 2009. Innovative coopetition: the strength of strong ties. *International Journal of Entrepreneurship and Small Business,* 8(1), pp. 110-134

BROWN, J.D., 2011. Likert items and scales of measurement. *Statistics,* 15(1), pp. 10-14

BRUCE, C.S., 1994. Research students' early experiences of the dissertation literature review. *Studies in Higher Education,* 19(2), pp. 217-229

BRYMAN, A., 2001. *Triangulation. Retrieved February 15, 2010,*

BRYMAN, A. and BELL, E., 2015. Business Research Methods (Vol. fourth). *Glasgow: Bell & Bain Ltd,*

BRYMAN, A., 2016. *Social research methods.* Oxford university press.

BRYMAN, A. and CRAMER, D., 2004. Constructing variables. *Handbook of data analysis,* , pp. 17-34

BRYMAN, A. and CRAMER, D., 2004. *Quantitative data analysis with SPSS 12 and 13: A guide for social scientists.* Routledge.

BRYMAN, A. and CRAMER, D., 2005. *Quantitative Data Analysis with SPSS 12 and 13: A Guide for Social Scientists.* Psychology Press.

BRYSMAN, H. and BURGESS, R., 1999. Qualitative research methodology: A review.

BURSTRÖM, T., 2012. Understanding PMs' activities in a coopetitive interorganizational multi-project setting. *International Journal of Managing Projects in Business,* 5(1), pp. 27-50

BYRNE, B.M., 2016. Structural Equation Modeling With AMOS: Basic Concepts, Applications, and Programming.

CAMERON, K.S. and QUINN, R.E., 1988. *Organizational paradox and transformation.* Ballinger Publishing Co/Harper & Row Publishers.

CANNON, J.P. and PERREAULT JR, W.D., 1999. Buyer–seller relationships in business markets. *Journal of Marketing Research,* 36(4), pp. 439-460

CAO, M. and ZHANG, Q., 2011. Supply chain collaboration: Impact on collaborative advantage and firm performance. *Journal of Operations Management,* 29(3), pp. 163-180

CAO, Z. and LUMINEAU, F., 2015. Revisiting the interplay between contractual and relational governance: A qualitative and meta-analytic investigation. *Journal of Operations Management,* 33, pp. 15-42

CARAYANNIS, E.G. and GONZALEZ, E., 2003. Creativity and innovation= competitiveness? When, how, and why. *The international handbook on innovation.* Elsevier. pp. 587-606

CARAYANNIS, E. and ALEXANDER, J., 2006. *Global and local knowledge: glocal transatlantic public-private partnerships for research and technological development.* Springer.

CARNEIRO, A., 2000. How does knowledge management influence innovation and competitiveness? *Journal of knowledge management,* 4(2), pp. 87-98

CARSON, D. et al., 2001. *Qualitative marketing research.* Sage.

CARSON, S.J., MADHOK, A. and WU, T., 2006. Uncertainty, opportunism, and governance: The effects of volatility and ambiguity on formal and relational contracting. *Academy of Management Journal,* 49(5), pp. 1058-1077

CASSIMAN, B., DI GUARDO, M.C. and VALENTINI, G., 2009. Organising R&D projects to profit from innovation: Insights from co-opetition. *Long range planning,* 42(2), pp. 216-233

CASTALDO, S., PREMAZZI, K. and ZERBINI, F., 2010. The meaning (s) of trust. A content analysis on the diverse conceptualizations of trust in scholarly research on business relationships. *Journal of Business Ethics,* 96(4), pp. 657-668

CEPTUREANU, E.G. and CEPTUREANU, S.I., 2019. The impact of adoptive management innovations on medium-sized enterprises from a dynamic capability perspective. *Technology Analysis & Strategic Management,* , pp. 1-15

CEPTUREANU, E.G. et al., 2018b. What makes coopetition successful? An inter-organizational side analysis on coopetition critical success factors in oil and gas distribution networks. *Energies,* 11(12), pp. 3447

CEPTUREANU, S. et al., 2018a. An exploratory study on knowledge management process barriers in the oil industry. *Energies,* 11(8), pp. 1977

CHANG, W. and CHIU, C., 2016. Coopetition under alliance? Applying awareness-motivation-capability competitive dynamics perspective. *Journal of Business Economics and Management,* 17(5), pp. 701-716

CHARMAZ, K., 2006. *Constructing grounded theory: A practical guide through qualitative analysis.* sage.

CHARMAZ, K. and BELGRAVE, L.L., 2007. Grounded theory. *The Blackwell encyclopedia of sociology,*

CHEN, D., DAI, L. and LI, D., 2019. A Delicate Balance for Innovation: Competition and Collaboration in R&D Consortia. *Management and Organization Review,* 15(1), pp. 145-176

CHEN, J. and CHANG, C., 2012. The co-opetitive strategy of a closed-loop supply chain with remanufacturing. *Transportation Research Part E: Logistics and Transportation Review,* 48(2), pp. 387-400

CHEN, L. et al., 2017. Supply chain collaboration for sustainability: A literature review and future research agenda. *International Journal of Production Economics,*

CHEN, M., 1996. Competitor analysis and interfirm rivalry: Toward a theoretical integration. *Academy of management review,* 21(1), pp. 100-134

CHEN, M., 2008. Reconceptualizing the competition-cooperation relationship: A transparadox perspective. *Journal of Management Inquiry,*

CHEN, M., KUO-HSIEN, S. and TSAI, W., 2007. Competitive tension: The awareness-motivation-capability perspective. *Academy of Management Journal,* 50(1), pp. 101-118

CHEN, X., CHEN, L. and WU, D., 2018. Factors That Influence Employees' Security Policy Compliance: An Awareness-Motivation-Capability Perspective. *Journal of Computer Information Systems,* 58(4), pp. 312-324

CHENG, J., YEH, C. and TU, C., 2008. Trust and knowledge sharing in green supply chains. *Supply Chain Management: An International Journal,* 13(4), pp. 283-295

CHERINGTON, P., 1976. *Advertising as a Business Force: A Compilation of Experiences.* Reissue edition ed. Manchester, NH: Ayer,.

CHETTY, S.K. and WILSON, H.I., 2003. Collaborating with competitors to acquire resources. *International Business Review,* 12(1), pp. 61-81

CHIAMBARETTO, P. and DUMEZ, H., 2016. Toward a typology of coopetition: a multilevel approach. *International Studies of Management & Organization,* 46(2-3), pp. 110-129

CHIAMBARETTO, P. and FERNANDEZ, A., 2016. The evolution of coopetitive and collaborative alliances in an alliance portfolio: The Air France case. *Industrial Marketing Management,* 57, pp. 75-85

CHIAMBARETTO, P., MASSÉ, D. and MIRC, N., 2019. "All for One and One for All?"-Knowledge broker roles in managing tensions of internal coopetition: The Ubisoft case. *Research Policy,* 48(3), pp. 584-600

CHILD, J. et al., 2005. *Cooperative strategy.* Oxford University Press, USA.

CHIMA, C.M., 2007. Supply-chain management issues in the oil and gas industry. *Journal of Business & Economics Research (JBER),* 5(6),

CHIM-MIKI, A.F. and BATISTA-CANINO, R.M., 2017. The coopetition perspective applied to tourism destinations: a literature review. *Anatolia,* 28(3), pp. 381-393

CHIM-MIKI, A.F. and BATISTA-CANINO, R.M., 2017. Tourism coopetition: An introduction to the subject and a research agenda. *International Business Review,* 26(6), pp. 1208-1217

CHIM-MIKI, A.F. and BATISTA-CANINO, R.M., 2018. Development of a tourism coopetition model: A preliminary Delphi study. *Journal of Hospitality and Tourism Management,* 37, pp. 78-88

CHIM-MIKI, A.F. and BATISTA-CANINO, R.M., 2017. Partnering based on coopetition in the interorganizational networks of tourism: a comparison between Curitiba and Foz do Iguaçu, Brazil. *Revista Brasileira de Gestão de Negócios-RBGN,* 19(64), pp. 219-235

CHIM-MIKI, A.F., GÂNDARA, J.M. and BATISTA-CANINO, R.M., 2017. Collaborative network organisations as platform for value co-creation in tourism destinations: an analysis of Foz do Iguaçu, Brazil. *International Journal of Tourism Policy,*

CHIN, K., CHAN, B.L. and LAM, P., 2008. Identifying and prioritizing critical success factors for coopetition strategy. *Industrial Management & Data Systems,* 108(4), pp. 437-454

CHOPRA, S. and SODHI, M., 2014. Reducing the risk of supply chain disruptions. *MIT Sloan management review,* 55(3), pp. 72-80

CHOWDHURY, M.M.H. and QUADDUS, M., 2017. Supply chain resilience: Conceptualization and scale development using dynamic capability theory. *International Journal of Production Economics,* 188, pp. 185-204

CHRIST, K.L., BURRITT, R.L. and VARSEI, M., 2017. Coopetition as a potential strategy for corporate sustainability. *Business Strategy and the Environment,* 26(7), pp. 1029-1040

CHRISTENSEN, L.T. and CORNELISSEN, J., 2015. Organizational transparency as myth and metaphor. *European Journal of Social Theory,* 18(2), pp. 132-149

CHRISTIANS, V.A., 2016. *Collaborating with competitors: value through coopetition in the New Zealand forest industry: a thesis presented in partial fulfilment of the requirements for the degree of Master of Supply Chain Management at Massey University, Manawatu, New Zealand,*

CHURCHILL, G.A., BROWN, T.J. and SUTER, T.A., 1996. Basic marketing research.

CLARK, P., 2012. *Organizations in action: Competition between contexts.* Routledge.

CLARKE, A. and MACDONALD, A., 2019. Outcomes to partners in multi-stakeholder cross-sector partnerships: A resource-based view. *Business & Society,* 58(2), pp. 298-332

CLARKE-HILL, C., LI, H. and DAVIES, B., 2003. The paradox of co-operation and competition in strategic alliances: towards a multi-paradigm approach. *Management Research News,* 26(1), pp. 1-20

COBANOGLU, C., MOREO, P.J. and WARDE, B., 2001. A comparison of mail, fax and web-based survey methods. *International journal of market research,* 43(4), pp. 1-15

COHEN, L., MANION, L. and MORRISON, K., 2002. *Research methods in education.* routledge.

COHEN, L., MANION, L. and MORRISON, K., 2013. *Research Methods in Education.* Routledge.

COLLIS, J. and HUSSEY, R., 2009. A practical guide for undergraduate and postgraduate students.

CONTRACTOR, F.J. and LORANGE, P., 1988. Why should firms cooperate? The strategy and economics basis for cooperative ventures. *Cooperative strategies in international business,* 1, pp. 3-30

COOK, C., HEATH, F. and THOMPSON, R.L., 2000. A meta-analysis of response rates in web-or internet-based surveys. *Educational and psychological measurement,* 60(6), pp. 821-836

COPULSKY, J.R. and WOLF, M.J., 1990. Relationship marketing: positioning for the future. *Journal of Business Strategy,* 11(4), pp. 16-20

CORBIN, J., STRAUSS, A.L. and STRAUSS, A., 2015. *Basics of qualitative research.* sage.

COUGHLAN, A.T., 1985. Competition and cooperation in marketing channel choice: Theory and application. *Marketing science,* 4(2), pp. 110-129

COUPER, M.P., 2000. Web surveys: A review of issues and approaches. *Public opinion quarterly,* 64(4), pp. 464-494

COUSINS, P.D., 2002. A conceptual model for managing long-term inter-organisational relationships. *European Journal of Purchasing & Supply Management,* 8(2), pp. 71-82

COZZOLINO, A. and ROTHAERMEL, F.T., 2018. Discontinuities, competition, and cooperation: Coopetitive dynamics between incumbents and entrants. *Strategic Management Journal,* 39(12), pp. 3053-3085

CREED, W. et al., 1996. Trust in organizations. *Trust in organizations: Frontiers of theory and research,* , pp. 16-38

CRESWELL, J.W., 2009. *Mapping the field of mixed methods research,*

CRESWELL, J.W., 2014. *A concise introduction to mixed methods research.* SAGE publications.

CRESWELL, J.W. et al., 2007. Qualitative research designs: Selection and implementation. *The counseling psychologist,* 35(2), pp. 236-264

CRESWELL, J.W. et al., 2006. How interpretive qualitative research extends mixed methods research. *Research in the Schools,* 13(1), pp. 1-11

CRICK, J.M., 2018. The facets, antecedents and consequences of coopetition: an entrepreneurial marketing perspective. *Qualitative Market Research: An International Journal,* 21(2), pp. 253-272

CROUCH, S. and HOUSDEN, M., 2012. *Marketing research for managers.* Routledge.

CROUCH, W., 2003. Housden M. *Marketing Research for Managers.Third Edition.Butterworth-Heinemann,*

CURRALL, S.C. and INKPEN, A.C., 2002. A multilevel approach to trust in joint ventures. *Journal of International Business Studies,* 33(3), pp. 479-495

CYGLER, J. et al., 2018. Benefits and drawbacks of coopetition: The roles of scope and durability in coopetitive relationships. *Sustainability,* 10(8), pp. 2688

CZACHON, W. and MUCHA-KUŚ, K., 2014. Coopetition research landscape-a systematic literature review 1997-2010. *Journal of Economics & Management,* 17, pp. 122-150

CZAKON, W., 2010. Emerging coopetition: an empirical investigation of coopetition as inter-organizational relationship instability. *Coopetition: Winning strategies for the 21st century,* , pp. 58-73

CZAKON, W., KLIMAS, P. and MARIANI, M., 2019. Behavioral antecedents of coopetition: A synthesis and measurement scale. *Long range planning,*

CZAKON, W. and ROGALSKI, M., 2014. Coopetition typology revisited–a behavioural approach. *International Journal of Business Environment,* 6(1), pp. 28-46

DAGNINO, G. and PADULA, G., 2002. Coopetition strategic: towards a new kind of interfirm dynamics. *The European Academy of Management. Stockholm: Second annual conference-innovative research in management.*

DAGNINO, G.B. and ROCCO, E., 2009. *Co-opetition Strategy: Theory, experiments and cases.* Routledge.

DAGNINO, G.B., 2007. Preface: Coopetition Strategy—Toward a New Kind of Inter-Firm Dynamics? *International Studies of Management & Organization,* 37(2), pp. 3-10

DAGNINO, G.B., 2009. Coopetition strategy: a new kind of interfirm dynamics for value creation. *Coopetition strategy.* Routledge. pp. 45-63

DAGNINO, G.B. and PADULA, G., 2009. Coopetition strategy. *Coopetition strategy: Theory, experiments and cases,* , pp. 25-43

DAHL, J., 2014. Conceptualizing coopetition as a process: An outline of change in cooperative and competitive interactions. *Industrial Marketing Management,* 43(2), pp. 272-279

DAHL, J., KOCK, S. and LUNDGREN-HENRIKSSON, E., 2016. Conceptualizing coopetition strategy as practice: A multilevel interpretative framework. *International Studies of Management & Organization,* 46(2-3), pp. 94-109

DAROŃ, M., 2017. A Verification of Advantages and Disadvantages in Partnership Relations,". *Zeszyty Naukowe Politechniki Częstochowskiej.Zarządzanie,* (27), pp. 96-105

DAS, T.K. and TENG, B., 1998. Between trust and control: Developing confidence in partner cooperation in alliances. *Academy of management review,* 23(3), pp. 491-512

DAS, T. and TENG, B., 1996. Risk types and inter-firm alliance structures. *Journal of management studies,* 33(6), pp. 827-843

DAS, T.K. and TENG, B., 2000. A resource-based theory of strategic alliances. *Journal of management,* 26(1), pp. 31-61

DAS, T.K. and TENG, B., 2000. Instabilities of strategic alliances: An internal tensions perspective. *Organization science,* 11(1), pp. 77-101

DAVID BERZINA CECD, F. and ROSA, M., 2014. coopetition. *Economic Development Journal,* 13(2), pp. 7

DAVIS, W.R., 1993. The FC1 rule of identification for confirmatory factor analysis: A general sufficient condition. *Sociological Methods & Research,* 21(4), pp. 403-437

DAWES, J., 2008. Do data characteristics change according to the number of scale points used? An experiment using 5-point, 7-point and 10-point scales. *International journal of market research*, *50*(1), pp.61-104. *International journal of market research,* 50(1), pp. 61-104

DE ROND, M. and BOUCHIKHI, H., 2004. On the dialectics of strategic alliances. *Organization Science,* 15(1), pp. 56-69

DE VOS, A. et al., 2011. Research at grass roots: A primer for the social science and human professions.

DEGENER, P., MAURER, I. and BORT, S., 2018. Alliance portfolio diversity and innovation: The interplay of portfolio coordination capability and proactive partner selection capability. *Journal of Management Studies,* 55(8), pp. 1386-1422

DELLA CORTE, V. and ARIA, M., 2016. Coopetition and sustainable competitive advantage. The case of tourist destinations.
. *Tourism Management,* 54(1), pp. 524-540

DELOITTE, 2015. *Impact report 2015.* [online] UK: Available from: https://www2.deloitte.com/uk/en/pages/about-deloitte-uk/articles/impact-report.html [Accessed August 2017]

DELOITTE, 2017. *UKCS upstream supply chain collaboration survey.* UK: Deloitte.

DELOITTE, 2018. *UKCS upstream supply chain collaboration survey 2018 collaboration at a crossroads – which way next? .* [online] UK: Available from: https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/energy-resources/deloitte-uk-ukcs-upstream-supply-chain-collaboration-survey-2018.pdf [Accessed January 2019]

DELOITTE CONSULTING, L., 1999. Deloitte Consulting's Perspective: Making ERP spell ROI. *ERP's Second Wave: Maximizing the Value of ERP-Enabled processes,* , pp. 17-23

DENSCOMBE, M., 2008. Communities of practice: A research paradigm for the mixed methods approach. *Journal of mixed methods research,* 2(3), pp. 270-283

DEVELLIS, R.F., 2016. *Scale development: Theory and applications.* Sage publications.

DI GUARDO, C. and GALVAGNO, M., 2007. The dynamic capabilities view of coopetition: the case of intel, apple and microsoft.

DNV.GL*.* 2019. [online] UK: Available from: https://www.dnvgl.com/search?q=jip [Accessed June 2019]

DORN, S., 2016. Unpacking Coopetition Practices-A Theoretical Model of Coopetition Management. *Academy of Management Proceedings.* Academy of Management Briarcliff Manor, NY 10510. pp. 11408

DOWLING, M.J. et al., 1996. Multifaceted relationships under coopetition description and theory. *Journal of management inquiry,* 5(2), pp. 155-167

DRUCKMAN, D., 2005. *Doing research: Methods of inquiry for conflict analysis.* Sage.

DUDOVSKIY, J., 2018. *The ultimate guide to writing a dissertation in business studies.* [online] Available from: http://research-methodology.net/about-us/ebook/ [Accessed April 2019]

DUNNING, J.H., 1995. Reappraising the eclectic paradigm in an age of alliance capitalism. *Journal of International Business Studies,* , pp. 461-491

DUPUIS, S.L., 1999. Naked truths: Towards a reflexive methodology in leisure research. *Leisure sciences,* 21(1), pp. 43-64

DUSSAUGE, P., GARRETTE, B. and MITCHELL, W., 2004. Asymmetric performance: the market share impact of scale and link alliances in the global auto industry. *Strategic Management Journal,* 25(7), pp. 701-711

DWYER, F.R., SCHURR, P.H. and OH, S., 1987. Developing buyer-seller relationships. *The Journal of marketing,* , pp. 11-27

DYER, J.H. and HATCH, N.W., 2006. Relation-specific capabilities and barriers to knowledge transfers: creating advantage through network relationships. *Strategic Management Journal,* 27(8), pp. 701-719

DYER, J.H., KALE, P. and SINGH, H., 2001. How to make strategic alliances work. *MIT Sloan management review,* 42(4), pp. 37-37

DYER, J.H. and SINGH, H., 1998. The relational view: Cooperative strategy and sources of interorganizational competitive advantage. *Academy of management review,* 23(4), pp. 660-679

DYER, J.R. et al., 2009. Leadership, consensus decision making and collective behaviour in humans. *Philosophical transactions of the Royal Society of London.Series B, Biological sciences,* 364(1518), pp. 781-789

EASTON, G., 1990. Relationships among competitors. *The interface of marketing and strategy,* , pp. 57-100

EDWARDS, J.R., 2011. The fallacy of formative measurement. *Organizational Research Methods,* 14(2), pp. 370-388

EDWARDS, J.R. and BAGOZZI, R.P., 2000. On the nature and direction of relationships between constructs and measures. *Psychological methods,* 5(2), pp. 155

EHRENMANN, F. and REISS, M., 2012. Co-opetition as a facilitator of manufacturing competitiveness: opportunities and threats. *Enabling Manufacturing Competitiveness and Economic Sustainability.* Springer. pp. 403-408

EIKEBROKK, T.R. andOLSEN, D.H., 2005. Co-opetition and e-business success in SMEs: an empirical investigation of European SMEs. *System Sciences, 2005. HICSS'05. Proceedings of the 38th Annual Hawaii International Conference on.* IEEE. pp. 162a-162a

ENBERG, C., 2012. Enabling knowledge integration in coopetitive R&D projects—The management of conflicting logics. *International Journal of Project Management,* 30(7), pp. 771-780

ENYINDA, C.I. et al., 2011. Petroleum supply chain risk analysis in a multinational oil firm in Nigeria. *Journal of Marketing Development and Competitiveness,* 5(7), pp. 37-44

ERIKSSON, P.E., 2008. Achieving suitable coopetition in buyer–supplier relationships: the case of AstraZeneca. *Journal of Business-to-Business Marketing,* 15(4), pp. 425-454

ESTRADA, I., 2018. Knowledge management in coopetition. *Routledge Companion to Coopetition Strategies,*

ESTRADA, I., FAEMS, D. and DE FARIA, P., 2016. Coopetition and product innovation performance: The role of internal knowledge sharing mechanisms and formal knowledge protection mechanisms. *Industrial Marketing Management,* 53, pp. 56-65

FAN, W. and YAN, Z., 2010. Factors affecting response rates of the web survey: A systematic review. *Computers in Human Behavior,* 26(2), pp. 132-139

FANG, S., CHANG, Y. and PENG, Y., 2011. Dark side of relationships: A tensions-based view. *Industrial Marketing Management,* 40(5), pp. 774-784

FAYEZI, S., ZUTSHI, A. and O'LOUGHLIN, A., 2017. Understanding and development of supply chain agility and flexibility: a structured literature review. *International Journal of Management Reviews,* 19(4), pp. 379-407

FELDMAN, M.S., 2000. Organizational routines as a source of continuous change. *Organization science,* 11(6), pp. 611-629

FERNANDEZ, A. and CHIAMBARETTO, P., 2016. Managing tensions related to information in coopetition. *Industrial Marketing Management,* 53, pp. 66-76

FERNANDEZ, A., LE ROY, F. and GNYAWALI, D.R., 2014. Sources and management of tension in co-opetition case evidence from telecommunications satellites manufacturing in Europe. *Industrial Marketing Management,* 43(2), pp. 222-235

FERRIER, W.J., 2001. Navigating the competitive landscape: The drivers and consequences of competitive aggressiveness. *Academy of management journal,* 44(4), pp. 858-877

FERRIER, W.J., SMITH, K.G. and GRIMM, C.M., 1999. The role of competitive action in market share erosion and industry dethronement: A study of industry leaders and challengers. *Academy of management journal,* 42(4), pp. 372-388

FINK, A., 2016. How to Conduct Surveys: A Step-by-Step Guide. *Sage Publications Ltd (CA),*

FISHER III, S.H. and HERRICK, R., 2013. Old versus new: the comparative efficiency of mail and internet surveys of state legislators. *State Politics & Policy Quarterly,* 13(2), pp. 147-163

FJELDSTAD, Ø.D., BECERRA, M. and NARAYANAN, S., 2004. Strategic action in network industries: an empirical analysis of the European mobile phone industry. *Scandinavian Journal of Management,* 20(1-2), pp. 173-196

FLORESCU, M.S. et al., 2019. Sustainable Supply Chain Management Strategy Influence on Supply Chain Management Functions in the Oil and Gas Distribution Industry. *Energies,* 12(9), pp. 1632

FORD, D. and HÅKANSSON, H., 2006. The idea of business interaction. *The IMP Journal,* 1(1), pp. 4-20

FORD, J.D. and BACKOFF, R.W., 1988. *Organizational change in and out of dualities and paradox.* Ballinger Publishing Co/Harper & Row Publishers.

FOWLER, F., 2014. Survey Research Methods (Fifth edit).

FOX, H., 1973. Product life cycle—An aid to financial administration. *financial executive,* 41, pp. 28-34

FRANK, R.H., 1988. *Passions within reason: the strategic role of the emotions.* WW Norton & Co.

FRANKFORT-NACHMIAS, C. and NACHMIAS, D., 2008. Research methods in the social sciences 5th ed. *New York, NY: Worth,*

FRAZIER, G.L., 2009. Physical distribution and channel management: a knowledge and capabilities perspective. *Journal of Supply Chain Management,* 45(2), pp. 23-36

FROHLICH, M.T. and WESTBROOK, R., 2001. Arcs of integration: an international study of supply chain strategies. *Journal of Operations Management,* 19(2), pp. 185-200

GARCÍA-CANAL, E. et al., 2002. Accelerating international expansion through global alliances: A typology of cooperative strategies. *Journal of World Business,* 37(2), pp. 91-107

GARSON, G.D., 2012. Testing statistical assumptions. *Asheboro, NC: Statistical Associates Publishing,*

GARVIN, A.J. et al., 1976. Cytochemical differentiation of nucleic acids with a Schiff-methylene blue sequence. *The journal of histochemistry and cytochemistry : official journal of the Histochemistry Society,* 24(4), pp. 587-590

GAST, J. et al., 2015. Coopetition research: towards a better understanding of past trends and future directions. *International Journal of Entrepreneurship and Small Business,* 24(4), pp. 492-521

GAST, J. et al., 2019. Knowledge management and coopetition: How do cooperating competitors balance the needs to share and protect their knowledge? *Industrial Marketing Management,* 77, pp. 65-74

GHOBADI, S. and D'AMBRA, J., 2012. Coopetitive relationships in cross-functional software development teams: How to model and measure? *Journal of Systems and Software,* 85(5), pp. 1096-1104

GIBBS, G.R., 2007. Thematic coding and categorizing. *Analyzing qualitative data,* 703, pp. 38-56

GILBERT, L.S., 2002. Going the distance:'closeness' in qualitative data analysis software. *International journal of social research methodology,* 5(3), pp. 215-228

GIMENEZ, C. and VENTURA, E., 2003. Supply chain management as a competitive advantage in the Spanish grocery sector. *The International Journal of Logistics Management,* 14(1), pp. 77-88

GNYAWALI, D.R. et al., 2016. The competition–cooperation paradox in inter-firm relationships: A conceptual framework. *Industrial Marketing Management,* 53, pp. 7-18

GNYAWALI, D.R. and MADHAVAN, R., 2001. Cooperative networks and competitive dynamics: A structural embeddedness perspective. *Academy of Management review,* 26(3), pp. 431-445

GNYAWALI, D.R. and PARK, B.R., 2011. Co-opetition between giants: Collaboration with competitors for technological innovation. *Research Policy,* 40(5), pp. 650-663

GNYAWALI, D.R. and PARK, B.R., 2009. Co-opetition and technological innovation in small and medium-sized enterprises: A multilevel conceptual model. *Journal of Small Business Management,* 47(3), pp. 308-330

GNYAWALI, D.R. and RYAN CHARLETON, T., 2018. *Nuances in the interplay of competition and cooperation: towards a theory of coopetition,*

GNYAWALI, D.R. and SRIVASTAVA, M.K., 2013. Complementary effects of clusters and networks on firm innovation: A conceptual model. *Journal of Engineering and Technology Management,* 30(1), pp. 1-20

GNYAWALI, D., HE, J. and MADHAVAN, R., 2008. Co-opetition: promises and challenges. *21st century management: A reference handbook,* , pp. 386-398

GNYAWALI, D., MADHAVAN, R., HE, J. and BENGTSSON, M., 2012. Contradictions, dualities and tensions in cooperation and competition: A capability based framework. *Annual Meeting of the Academy of Management, Boston, MA.*

GOMES-CASSERES, B., 1994. Group versus group: How alliance networks compete. *Harvard business review,* 72(4), pp. 62-66

GONZÁLEZ-BENITO, Ó., MUÑOZ-GALLEGO, P.A. and GARCÍA-ZAMORA, E., 2016. Role of collaboration in innovation success: differences for large and small businesses. *Journal of Business Economics and Management,* 17(4), pp. 645-662

GRANADOS, N. and GUPTA, A., 2013. Transparency strategy: competing with information in a digital world. *Mis Quarterly,* 37(2), pp. 637-642

GRANOVETTER, M., 1985. Economic action and social structure: The problem of embeddedness. *American journal of sociology,* 91(3), pp. 481-510

GRATTON, C. and JONES, I., 2014. *Research methods for sports studies.* Routledge.

GREENE, J.C. and CARACELLI, V.J., 1997. Defining and describing the paradigm issue in mixed-method evaluation. *New directions for evaluation,* 1997(74), pp. 5-17

GRONROOS, C., 2007. *Service management and marketing: Customer management in service competition.* Wiley Chichester.

GULATI, R., 1998. Alliances and networks. *Strategic Management Journal,* 19(4), pp. 293-317

GULATI, R. and GARGIULO, M., 1999. Where do interorganizational networks come from? *American journal of sociology,* 104(5), pp. 1439-1493

GULATI, R., LAVIE, D. and SINGH, H., 2009. The nature of partnering experience and the gains from alliances. *Strategic Management Journal,* 30(11), pp. 1213-1233

GULATI, R. and NICKERSON, J.A., 2008. Interorganizational trust, governance choice, and exchange performance. *Organization Science,* 19(5), pp. 688-708

GULATI, R., NOHRIA, N. and ZAHEER, A., 2000. Strategic networks. *Strategic Management Journal,* 21(3), pp. 203-215

GULATI, R., WOHLGEZOGEN, F. and ZHELYAZKOV, P., 2012. The two facets of collaboration: Cooperation and coordination in strategic alliances. *The Academy of Management Annals,* 6(1), pp. 531-583

GURNANI, H., ERKOC, M. and LUO, Y., 2007. Impact of product pricing and timing of investment decisions on supply chain co-opetition. *European Journal of Operational Research,* 180(1), pp. 228-248

HA, A.Y. and TONG, S., 2008. Contracting and information sharing under supply chain competition. *Management science,* 54(4), pp. 701-715

HAIR, J.F., RINGLE, C.M. and SARSTEDT, M., 2011. PLS-SEM: Indeed a silver bullet. *Journal of Marketing theory and Practice,* 19(2), pp. 139-152

HÅKANSSON, H. and FORD, D., 2002. How should companies interact in business networks? *Journal of business research,* 55(2), pp. 133-139

HAMEL, G., 1991. Competition for competence and interpartner learning within international strategic alliances. *Strategic Management Journal,* 12(S1), pp. 83-103

HAMEL, G., DOZ, Y.L. and PRAHALAD, C.K., 1989. Collaborate with your competitors and win. *Harvard business review,* 67(1), pp. 133-139

HAMMERSLEY, M., 1993. *Social research: philosophy, politics and practice.* Sage.

HAMMERSLEY, M., 2012. *What is qualitative research?* A&C Black.

HANSEN, J.Ø. and SCHÜTTER, H., 2009. *The Resource-based View and Transaction Cost Economics in Managerial Decision-Making: A Sequential Approach,*

HARMELING, C.M. and PALMATIER, R.W., 2019. Relationship dynamics: understanding continuous and discontinuous relationship change. *Handbook of research on distribution channels.* Edward Elgar Publishing.

HARRIGAN, K.R., 1988. Joint ventures and competitive strategy. *Strategic Management Journal,* 9(2), pp. 141-158

HARRIS, A.Z., 2006. Interorganizational trust. *O.Shenkar and J.Reuer (eds),* , pp. 169-197

HARRISON, J.S. et al., 2001. Resource complementarity in business combinations: Extending the logic to organizational alliances. *Journal of management,* 27(6), pp. 679-690

HASSANDOUST, F. and KAZEROUNI, M.F., 2011. Implications Knowledge Sharing through E-Collaboration and Communication Tools. *Journal of Knowledge Management, Economics and Information Technology,* 1(3),

HAYES, R.H. and WHEELWRIGHT S.C, 1984. *Restoring our competitive edge: competing through manufacturing, .* New York: John Wiley and Sons.

HEAPHY, E.D. et al., 2018. Introduction to Special Topic Forum: The Changing Nature of Work Relationships. *Academy of Management Review,* 43(4), pp. 558-569

HEIMERIKS, K.H. and DUYSTERS, G., 2007. Alliance capability as a mediator between experience and alliance performance: An empirical investigation into the alliance capability development process. *Journal of Management Studies,* 44(1), pp. 25-49

HEIMERIKS, K.H., DUYSTERS, G. and VANHAVERBEKE, W., 2007. Learning mechanisms and differential performance in alliance portfolios. *Strategic organization,* 5(4), pp. 373-408

HEIMERIKS, K.H., KLIJN, E. and REUER, J.J., 2009. Building capabilities for alliance portfolios. *Long range planning,* 42(1), pp. 96-114

HENDERSON, K.A., 2011. Post-positivism and the pragmatics of leisure research. *Leisure Sciences,* 33(4), pp. 341-346

HENN, M., WEINSTEIN, M. and FOARD, N., 2006. A short introduction to social science.

HENNART, J., 2006. Alliance research: Less is more. *Journal of Management Studies,* 43(7), pp. 1621-1628

HENNIG, S. and MALMSTEN, A., 2019. Coopetition in a regulated market: A study of motivational factors and risks in coopetition.

HENNING, E., VAN RENSBURG, W. and SMIT, B., 2004. Finding your way in qualitative research.

HETHERINGTON, E.D., 2000. Reconsidering Logical Positivism. *The Review of Metaphysics,* 54(2), pp. 428-430

HILL, C.W., JONES, G.R. and SCHILLING, M., 1998. Strategic management theory: An integrated approach.

HOETKER, G. and MELLEWIGT, T., 2009. Choice and performance of governance mechanisms: matching alliance governance to asset type. *Strategic Management Journal,* 30(10), pp. 1025-1044

HOKROH, M.A., 2014. An analysis of the oil and gas industry's competitiveness using Porter's five forces framework. *Global Journal of Commerce and Management Perspective,* 3(2), pp. 76-82

HOLDEN, R., 1990. An exploratory study of trust in buyerąseller relationships. A Dissertation, University Microfilms International. *Ann Arbor, MI,*

HOLMQVIST, M., 2003. Intra-and interorganisational learning processes: an empirical comparison. *Scandinavian journal of management,* 19(4), pp. 443-466

HOLMQVIST, M., 2004. Experiential learning processes of exploitation and exploration within and between organizations: An empirical study of product development. *Organization science,* 15(1), pp. 70-81

HOSKISSON, R.E. et al., 1999. Theory and research in strategic management: Swings of a pendulum. *Journal of management,* 25(3), pp. 417-456

HOWARD, M. et al., 2019. Converging and diverging governance mechanisms: the role of (Dys) function in long-term inter-organizational relationships. *British Journal of Management,* 30(3), pp. 624-644

HOWELL, R.D., BREIVIK, E. and WILCOX, J.B., 2007. Is formative measurement really measurement? Reply to Bollen (2007) and Bagozzi (2007).

HU, L. and BENTLER, P.M., 1999. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal,* 6(1), pp. 1-55

HUANG, Y. et al., 2016. An investigation of interpersonal ties in interorganizational exchanges in emerging markets: A boundary-spanning perspective. *Journal of Management,* 42(6), pp. 1557-1587

HUEMER, L., 2004. Activating trust: the redefinition of roles and relationships in an international construction project. *International Marketing Review,* 21(2), pp. 187-201

HUNG, S. and CHANG, C., 2012. A co-opetition perspective of technology alliance governance modes. *Technology Analysis & Strategic Management,* 24(7), pp. 679-696

HUTTER, K. et al., 2011. Communitition: The tension between competition and collaboration in community-based design contests. *Creativity and Innovation Management,* 20(1), pp. 3-21

HUXHAM, C. and VANGEN, S., 2000. Leadership in the shaping and implementation of collaboration agendas: How things happen in a (not quite) joined-up world. *Academy of Management journal,* 43(6), pp. 1159-1175

IACOBUCCI, D., 2010. Structural equations modeling: Fit indices, sample size, and advanced topics. *Journal of consumer psychology,* 20(1), pp. 90-98

IOGP, 2016. *JIP reaches standardization milestone.* [online] UK: International Organisation of Oil and Gas Producers. Available from: https://www.iogp.org/blog/international-standards/jip33/jip-reaches-standardization-milestone/ [Accessed June 2019]

IRELAND, R.D., HITT, M.A. and VAIDYANATH, D., 2002. Alliance management as a source of competitive advantage. *Journal of management,* 28(3), pp. 413-446

IVANKOVA, N., CRESWELL, J. and PLANO CLARK, V., 2007. Foundations and approaches to mixed methods research. *First steps in research.Pretoria: Van Schaik,* , pp. 253-282

JAP, S.D., 2001. "Pie sharing" in complex collaboration contexts. *Journal of Marketing Research,* 38(1), pp. 86-99

JAP, S.D. and ANDERSON, E., 2007. Testing a life-cycle theory of cooperative interorganizational relationships: Movement across stages and performance. *Management Science,* 53(2), pp. 260-275

JARVIS, C.B., MACKENZIE, S.B. and PODSAKOFF, P.M., 2003. A critical review of construct indicators and measurement model misspecification in marketing and consumer research. *Journal of consumer research,* 30(2), pp. 199-218

JARZABKOWSKI, P., 2005. *Strategy as practice: An activity based approach.* Sage.

JASKYTE, K. and LEE, M., 2006. Interorganizational relationships: A source of innovation in nonprofit organizations? *Administration in Social Work,* 30(3), pp. 43-54

JORDAN, S.R., 2013. Conceptual clarification and the task of improving research on academic ethics. *Journal of Academic Ethics,* 11(3), pp. 243-256

JOSHI, A., KALE, S., CHANDEL, S. AND PAL, D.K., 2015. Likert scale: Explored and explained. *British Journal of Applied Science & Technology,* 7(4), pp. 396

JUDD, C.M., SMITH, E.R. and KIDDER, L.H., 1991. Research methods in social science. *Fort Worth: Holt, Rinehart, and Wanston,*

KALE, P., DYER, J.H. and SINGH, H., 2002. Alliance capability, stock market response, and long-term alliance success: the role of the alliance function. *Strategic Management Journal,* 23(8), pp. 747-767

KALE, P., DYER, J. and SINGH, H., 2001. Value creation and success in strategic alliances:: alliancing skills and the role of alliance structure and systems. *European Management Journal,* 19(5), pp. 463-471

KALE, P. and SINGH, H., 2007. Building firm capabilities through learning: the role of the alliance learning process in alliance capability and firm-level alliance success. *Strategic Management Journal,* 28(10), pp. 981-1000

KALE, P., SINGH, H. and PERLMUTTER, H., 2000. Learning and protection of proprietary assets in strategic alliances: Building relational capital. *Strategic Management Journal,* 21(3), pp. 217-237

KALE, P., SINGH, H. and RAMAN, A.P., 2009. Don't integrate your acquisitions, partner with them. *Harvard business review,* 87(12), pp. 109-115

KANTER, R.M., 1994. Collaborative advantage. *Harvard business review,* 72(4), pp. 96-108

KAPLOWITZ, M.D. et al., 2012. The effect of invitation design on web survey response rates. *Social Science Computer Review,* 30(3), pp. 339-349

KENNY, D.A. and MCCOACH, D.B., 2003. Effect of the number of variables on measures of fit in structural equation modeling. *Structural equation modeling,* 10(3), pp. 333-351

KETCHEN JR, D.J., SNOW, C.C. and HOOVER, V.L., 2004. Research on competitive dynamics: Recent accomplishments and future challenges. *Journal of Management,* 30(6), pp. 779-804

KHANNA, T., GULATI, R. and NOHRIA, N., 1998. The dynamics of learning alliances: Competition, cooperation, and relative scope. *Strategic Management Journal,* 19(3), pp. 193-210

KIM, S. et al., 2013. Cooperate "and" compete: coopetition strategy in retailer-supplier relationships. *Journal of Business & Industrial Marketing,* 28(4), pp. 263-275

KIM, S., 2014. An adaptive smart grid management scheme based on the coopetition game model. *ETRI Journal,* 36(1), pp. 80-88

KLEIN, K. et al., 2019. Multimarket coopetition: How the interplay of competition and cooperation affects entry into shared markets. *Long Range Planning.,*

KLIMAS, P. and CZAKON, W., 2018. Organizational innovativeness and coopetition: a study of video game developers. *Review of Managerial Science,* 12(2), pp. 469-497

KLINE, R.B., 2015. *Principles and practice of structural equation modeling.*

KNOBEN, J. et al., 2018. What do they know? The antecedents of information accuracy differentials in interorganizational networks. *Organization Science,* 29(3), pp. 471-488

KOGUT, B., 1991. Joint ventures and the option to expand and acquire. *Management science,* 37(1), pp. 19-33

KOHTAMÄKI, M., RABETINO, R. and MÖLLER, K., 2018. Alliance capabilities: A systematic review and future research directions. *Industrial Marketing Management,* 68, pp. 188-201

KOPFER, H. et al., 2005. Exploring the performance effects of key-supplier collaboration. *International Journal of Physical Distribution & Logistics Management,*

KOTHARI, C.R., 2004. *Research methodology: Methods and techniques.* New Age International.

KOTZAB, H. and TELLER, C., 2003. Value-adding partnerships and co-opetition models in the grocery industry. *International Journal of Physical Distribution & Logistics Management,* 33(3), pp. 268-281

KOVACS, G. and SPENS, K., 2013. Co-opetition in logistics and supply chain management research. *International Journal of Physical Distribution & Logistics Management,* 43(7),

KRAUS, S. et al., 2019. Sleeping with competitors: Forms, antecedents and outcomes of coopetition of small and medium-sized craft beer breweries. *International Journal of Entrepreneurial Behavior & Research,* 25(1), pp. 50-66

KRAUS, S. et al., 2018. In search for the ideal coopetition partner: an experimental study. *Review of Managerial Science,* 12(4), pp. 1025-1053

KWOK, J.J.M. and LEE, D., 2015. Coopetitive supply chain relationship model: Application to the smartphone manufacturing network. *PloS one,* 10(7), pp. e0132844

KYLANEN, M. and MARIANI, M.M., 2012. Unpacking the temporal dimension of coopetition in tourism destinations: Evidence from Finnish and Italian theme parks. *Anatolia,* 23(1), pp. 61-74

KYLÄNEN, M. and RUSKO, R., 2011. Unintentional coopetition in the service industries: The case of Pyhä-Luosto tourism destination in the Finnish Lapland. *European Management Journal,* 29(3), pp. 193-205

LACOSTE, S., 2012. "Vertical coopetition": The key account perspective. *Industrial Marketing Management,* 41(4), pp. 649-658

LADO, A.A., BOYD, N.G. and HANLON, S.C., 1997. Competition, cooperation, and the search for economic rents: a syncretic model. *Academy of Management Review,* 22(1), pp. 110-141

LAHIRI, N. and NARAYANAN, S., 2013. Vertical integration, innovation, and alliance portfolio size: Implications for firm performance. *Strategic Management Journal,* 34(9), pp. 1042-1064

LAVIE, D., 2016. Alliance capability. *The Palgrave Encyclopedia of Strategic Management,* , pp. 1-4

LAVIE, D., LECHNER, C. and SINGH, H., 2007. The performance implications of timing of entry and involvement in multipartner alliances. *Academy of Management Journal,* 50(3), pp. 578-604

LE PENNEC, M. and RAUFFLET, E., 2018. Value creation in inter-organizational collaboration: An empirical study. *Journal of Business Ethics,* 148(4), pp. 817-834

LE ROY, F. and CZAKON, W., 2016. Managing coopetition: the missing link between strategy and performance. *Industrial Marketing Management,* 53(1), pp. 3-6

LE ROY, F. and FERNANDEZ, A., 2015. Managing coopetitive tensions at the working-group level: The rise of the coopetitive project team. *British Journal of Management,* 26(4), pp. 671-688

LE ROY, F., FERNANDEZ, A. and CHIAMBARETTO, P., 2018. From strategizing coopetition to managing coopetition. *The Routledge Companion to Coopetition Strategies.* Routledge Abingdon, UK. pp. 36-46

LE ROY, F. and SANOU, F.H., 2014. Does coopetition strategy improve market performance? An empirical study in mobile phone industry. *Journal of Economics & Management,* 17, pp. 64-92

LEE, H. and CLARK, A., 2018. Charging the Future: Challenges and Opportunities for Electric Vehicle Adoption.

LEE, J.Y., SAUNDERS, C. and PANTELI, N., 2018. Interfirm Relational Governance through Media Choice and Communication Practices in the Coopetitive Context.

LEVINE, S. and WHITE, P.E., 1961. Exchange as a conceptual framework for the study of interorganizational relationships. *Administrative Science Quarterly,* , pp. 583-601

LEVITT, T., 1965. *Exploit the product life cycle.* Graduate School of Business Administration, Harvard University.

LEVY, M., LOEBBECKE, C. and POWELL, P., 2003. SMEs, co-opetition and knowledge sharing: the role of information systems1. *European Journal of Information Systems,* 12(1), pp. 3-17

LI, S. et al., 2006. The impact of supply chain management practices on competitive advantage and organizational performance. *Omega,* 34(2), pp. 107-124

LI, Y. et al., 2010. Formal control and social control in domestic and international buyer–supplier relationships. *Journal of Operations Management,* 28(4), pp. 333-344

LINCOLN, Y.S., 2007. Naturalistic inquiry. *The Blackwell Encyclopedia of Sociology,*

LINK, A.N. and ANTONELLI, C., 2018. *Strategic Alliances: Leveraging Economic Growth and Development.* Routledge.

LINKEDIN, 2019. *About LinkedIn.* [online] Available from: https://about.linkedin.com/ [Accessed June 2019]

LIU, R., 2013. Cooperation, competition and coopetition in innovation communities. *Prometheus,* 31(2), pp. 91-105

LIU, W. and HOU, S., 2010. The awareness-motivation-capability approach to the cooperation relationships between franchisers and franchisees: The case of laundry business franchise system. *2010 IEEE International Conference on Management of Innovation & Technology.* IEEE. pp. 396-401

LIU, Y., LUO, Y. and LIU, T., 2009. Governing buyer–supplier relationships through transactional and relational mechanisms: Evidence from China. *Journal of Operations Management,* 27(4), pp. 294-309

LOEBBECKE, C., VAN FENEMA, P.C. and POWELL, P., 2016. Managing inter-organizational knowledge sharing. *The Journal of Strategic Information Systems,* 25(1), pp. 4-14

LORANGE, P. and CONTRACTOR, F.J., 1988. *Cooperative strategies in international business.* Lexington Books.

LUHMANN, N., 2000. Familiarity, confidence, trust: Problems and alternatives. *Trust: Making and breaking cooperative relations,* 6, pp. 94-107

LUI, S.S., 2009. The roles of competence trust, formal contract, and time horizon in interorganizational learning. *Organization Studies,* 30(4), pp. 333-353

LUO, Y., 2004. A coopetition perspective of MNC–host government relations. *Journal of International Management,* 10(4), pp. 431-451

LUO, Y., 2005. Toward coopetition within a multinational enterprise: a perspective from foreign subsidiaries. *Journal of World Business,* 40(1), pp. 71-90

LUO, Y., 2007. A coopetition perspective of global competition. *Journal of World Business,* 42(2), pp. 129-144

LUO, Y., SHENKAR, O. and GURNANI, H., 2008. Control–cooperation interfaces in global strategic alliances: a situational typology and strategic responses. *Journal of International Business Studies,* 39(3), pp. 428-453

LÜSCHER, L.S. and LEWIS, M.W., 2008. Organizational change and managerial sensemaking: Working through paradox. *Academy of management Journal,* 51(2), pp. 221-240

MACK, L., 2010. The philosophical underpinnings of educational research.

MAKADOK, R., 2001. Toward a synthesis of the resource-based and dynamic-capability views of rent creation. *Strategic Management Journal,* 22(5), pp. 387-401

MALLAPRAGADA, G. et al., 2015. Virtual interorganizational relationships in business-to-business electronic markets: heterogeneity in the effects of organizational interdependence on relational outcomes. *Journal of the Academy of Marketing Science,* 43(5), pp. 610-628

MANDJÁK, T. et al., 2016. Trigger issues in emerging relationships. *Industrial Marketing Management,* 58, pp. 137-147

MANN, Y., 2017. The Middle East and the New Era in the World Oil Market. *The Journal for Interdisciplinary Middle Eastern Studies,* , pp. 105-125

MARDIA, K.V., 1970. *Families of bivariate distributions.* Lubrecht & Cramer Ltd.

MARIANI, M.M., 2007. Coopetition as an emergent strategy: Empirical evidence from an Italian consortium of opera houses. *International Studies of Management and Organization,* 37(2), pp. 97-126

MARIANI, M.M., 2015. Coopetition in tourism destinations: Disentangling relevant temporal dimensions. *Academy of Management Proceedings.* Academy of Management Briarcliff Manor, NY 10510. pp. 16183

MARIANI, M. andKYLANEN, M., 2012. Inter-organizational relationships in time and space: coopetition in tourism destinations. *Proceedings of the 2nd EIASM conference on tourism management and tourism related issues.* pp. 20-21

MARION, T.J. et al., 2015. The evolution of interorganizational relationships in emerging ventures: An ethnographic study within the new product development process. *Journal of business Venturing,* 30(1), pp. 167-184

MARION, T.J. et al., 2015. The evolution of interorganizational relationships in emerging ventures: An ethnographic study within the new product development process. *Journal of business Venturing,* 30(1), pp. 167-184

MARTINEZ SANCHEZ, A. and PEREZ PEREZ, M., 2005. EDI and the moderator effect of interorganizational cooperation in the supply chain. *Journal of Organizational Computing and Electronic Commerce,* 15(2), pp. 83-104

MARTÍNEZ SÁNCHEZ, A. and PÉREZ PÉREZ, M., 2005. Supply chain flexibility and firm performance: a conceptual model and empirical study in the automotive industry. *International Journal of Operations & Production Management,* 25(7), pp. 681-700

MARTÍNEZ SÁNCHEZ, A. and PÉREZ PÉREZ, M., 2005. Supply chain flexibility and firm performance: a conceptual model and empirical study in the automotive industry. *International Journal of Operations & Production Management,* 25(7), pp. 681-700

MASON-JONES, R. and TOWILL, D.R., 1997. Information enrichment: designing the supply chain for competitive advantage. *Supply Chain Management: An International Journal,* 2(4), pp. 137-148

MATEI, E., 2010. Appraisal of Joint Dominance in the Landscape of Co-Opetition. *Romanian Journal of European Law,*

MATTHEWS, M. and HARRIS, P., 2018. Enhancing reciprocity in international cooperation in research: issues and metrics. *Supporting EU access to Australian research programmes,*

MATTSON, L. and JOHANSON, J., 1992. Network Positions and Strategic Action. *Industrial Networks: A New View of Reality,*

MAVLETOVA, A., 2013. Data quality in PC and mobile web surveys. *Social Science Computer Review,* 31(6), pp. 725-743

MAYER, K.J. and ARGYRES, N.S., 2004. Learning to contract: Evidence from the personal computer industry. *Organization Science,* 15(4), pp. 394-410

MCCARTHY, C. et al., 2018. Accelerating Innovation Through Coopetition. *Nursing administration quarterly,* 42(1), pp. 26-34

MCCARTHY, J., 2016. *Partnership, collaborative planning and urban regeneration.* Routledge.

MCDONALD, R.P. and HO, M.R., 2002. Principles and practice in reporting structural equation analyses. *Psychological methods,* 7(1), pp. 64

MCGILL, J.P., 2007. Technological knowledge and governance in alliances among competitors. *International Journal of Technology Management,* 38(1), pp. 69

MCGRATH, H., O'TOOLE, T. and CANNING, L., 2019. Coopetition: a fundamental feature of entrepreneurial firms' collaborative dynamics. *Journal of Business & Industrial Marketing.,*

M'CHIRGUI, Z., 2005. The economics of the smart card industry: towards coopetitive strategies. *Economics of Innovation and New Technology,* 14(6), pp. 455-477

MCNABB, D.E., 2015. *Research methods in public administration and nonprofit management.* Routledge.

MCQUAID, R.W., 2010. Theory of organizational partnerships: partnership advantages, disadvantages and success factors. *The New Public Governance?* Routledge. pp. 143-164

MEINDL, S.C.P., 2016. *Supply Chain Management--Strategy, Planning and Operation.* Tsinghua University Press. wheat soybean others land for no use.

MENTZER, J.T. et al., 2001. Defining supply chain management. *Journal of Business logistics,* 22(2), pp. 1-25

MESCHI, P., METAIS, E. and SHIMIZU, K., 2018. Does a Prior Alliance with the Target Affect Acquisition Performance? The Dangers of a Honeymoon before Marriage. *European Management Review,* 15(3), pp. 427-444

MESQUITA, L.F., RAGOZZINO, R. and REUER, J.J., 2017. *Collaborative strategy: Critical issues for alliances and networks.* Edward Elgar Publishing.

MILES, J. and SHEVLIN, M., 2007. A time and a place for incremental fit indices. *Personality and Individual Differences,* 42(5), pp. 869-874

MILLAR, M.M. and DILLMAN, D.A., 2011. Improving response to web and mixed-mode surveys. *Public opinion quarterly,* 75(2), pp. 249-269

MINA, A., 2012. Genesis and conceptualization of coopetition strategy.

MINÀ, A. and MOCCIARO LI DESTRI, A., 2009. Coopetitive Dynamics in Distribution Channel Relationships: An Analysis of the Italian Context in theTwentieth Century. *Finanza, marketing e produzione,* 27(2), pp. 29-49

MINTZBERG, H. and WATERS, J.A., 1985. Of strategies, deliberate and emergent. *Strategic Management Journal,* 6(3), pp. 257-272

MITTERLECHNER, M., MITTERLECHNER and HARRISON, 2019. *Leading in Inter-Organizational Networks.* Springer.

MOCCIARO, L. and MINÀ, A., 2009. Coopetitive dynamics in distribution channel relationship: an analysis of the Italian context in the twentieth century. *International Journal of Business Environment,* 2(1), pp. 2-21

MÖLLER, K. and RAJALA, A., 2007. Rise of strategic nets—New modes of value creation. *Industrial marketing management,* 36(7), pp. 895-908

MONTICELLI, J.M., GARRIDO, I.L. and DE VASCONCELLOS, S.L., 2018. Coopetition and institutions: a strategy for Brazilian wineries facing internationalization. *International Journal of Wine Business Research,* 30(1), pp. 74-95

MORRIS, P., 2004. *Realism.* Routledge.

MORSE, J.M., 2003. Principles of mixed methods and multimethod research design. *Handbook of mixed methods in social and behavioral research,* 1, pp. 189-208

MOUTON, J. and BABBIE, E., 2001. The practice of social research. *Cape Town: Wadsworth Publishing Company,* , pp. 871-890

MÜLLER, R. et al., 2013. The interrelationship of governance, trust, and ethics in temporary organizations. *Project Management Journal,* 44(4), pp. 26-44

MÜLLER, R. et al., 2016. A framework for governance of projects: Governmentality, governance structure and projectification. *International Journal of Project Management,* 34(6), pp. 957-969

MUTHUSAMY, S.K. and WHITE, M.A., 2005. Learning and knowledge transfer in strategic alliances: A social exchange view. *Organization Studies,* 26(3), pp. 415-441

MYERS, M.D., 2019. *Qualitative research in business and management.* Sage Publications Limited.

NAGURNEY, A., DONG, J. and ZHANG, D., 2002. A supply chain network equilibrium model. *Transportation Research Part E: Logistics and Transportation Review,* 38(5), pp. 281-303

NALEBUFF, B.J., BRANDENBURGER, A. and MAULANA, A., 1996. *Co-opetition.* HarperCollinsBusiness London.

NAU, D.S., 1995. Mixing methodologies: can bimodal research be a viable post-positivist tool? *The qualitative report,* 2(3), pp. 1-6

NEUMAN, W., 2011. Social research methods: qualitative and quantitative approaches (International ed. ed.). *Boston* http://www.cabinetoffice.gov.uk/sites/default/files/resources/assurance-highrisk-projects_0.pdf,

NIPPA, M. and REUER, J.J., 2019. On the future of international joint venture research. *Journal of International Business Studies,* 50(4), pp. 555-597

NNADILI, B.N., 2006. *Supply and demand planning for crude oil procurement in refineries,*

NOOTEBOOM, B., BERGER, H. and NOORDERHAVEN, N.G., 1997. Effects of trust and governance on relational risk. *Academy of management journal,* 40(2), pp. 308-338

NORTH, D.C., 1991. Institutions. *Journal of economic perspectives,* 5(1), pp. 97-112

NULTY, D.D., 2008. The adequacy of response rates to online and paper surveys: what can be done? *Assessment & evaluation in higher education,* 33(3), pp. 301-314

O'REILLY, M. and PARKER, N., 2013. 'Unsatisfactory Saturation': a critical exploration of the notion of saturated sample sizes in qualitative research. *Qualitative research,* 13(2), pp. 190-197

OIL AND GAS UK, 2017. *Economic Report 2017.* UK: Oil and Gas UK.

OKURA, M., 2007. Coopetitive strategies of Japanese insurance firms a game-theory approach. *International Studies of Management & Organization,* 37(2), pp. 53-69

OLIVEIRA, N. and LUMINEAU, F., 2019. The dark side of interorganizational relationships: An integrative review and research agenda. *Journal of Management,* 45(1), pp. 231-261

OLIVER, A.L., 2004. On the duality of competition and collaboration: network-based knowledge relations in the biotechnology industry. *Scandinavian Journal of Management,* 20(1), pp. 151-171

OLIVER, C., 1990. Determinants of interorganizational relationships: Integration and future directions. *Academy of management review,* 15(2), pp. 241-265

OLSON, E.M. et al., 2001. Patterns of cooperation during new product development among marketing, operations and R&D: Implications for project performance. *Journal of Product Innovation Management,* 18(4), pp. 258-271

ONS, 2017. *Extractive industries in the UK: Background information on oil and gas.* [online] UK: ONS. Available from: https://www.gov.uk/government/publications/extractive-industries-

transparency-initiative-payments-report-2017/extractive-industries-in-the-uk-background-information-on-oil-and-gas [Accessed June 2019]

OPPENHEIM, A.N., 2000. *Questionnaire design, interviewing and attitude measurement. .* Bloomsbury Publishing.

ORR, S.K., 2005. New technology and research: An analysis of internet survey methodology in political science. *PS: Political Science & Politics,* 38(2), pp. 263-267

OSARENKHOE, A., 2010. A study of inter-firm dynamics between competition and cooperation–A coopetition strategy. *Journal of Database Marketing & Customer Strategy Management,* 17(3-4), pp. 201-221

OSBORN, R.N. and HAGEDOORN, J., 1997. The institutionalization and evolutionary dynamics of interorganizational alliances and networks. *Academy of Management Journal,* 40(2), pp. 261-278

OSBORNE, J.W., COSTELLO, A.B. and KELLOW, J.T., 2008. Best practices in exploratory factor analysis. *Best practices in quantitative methods,* , pp. 86-99

PADULA, G. and DAGNINO, G.B., 2007. Untangling the rise of coopetition: the intrusion of competition in a cooperative game structure. *International Studies of Management & Organization,* 37(2), pp. 32-52

PALLANT, J., 2013. *SPSS survival manual.* McGraw-Hill Education (UK).

PARK, B.R., 2011. *The effects of coopetition and coopetition capability on firm innovation performance,*

PARK, B.R., SRIVASTAVA, M.K. and GNYAWALI, D.R., 2014. Walking the tight rope of coopetition: Impact of competition and cooperation intensities and balance on firm innovation performance. *Industrial Marketing Management,* 43(2), pp. 210-221

PARK, B., SRIVASTAVA, M.K. and GNYAWALI, D.R., 2014. Impact of coopetition in the alliance portfolio and coopetition experience on firm innovation. *Technology Analysis & Strategic Management,* 26(8), pp. 893-907

PARK, S.H. and RUSSO, M.V., 1996. When competition eclipses cooperation: An event history analysis of joint venture failure. *Management science,* 42(6), pp. 875-890

PARK, S.H. and UNGSON, G.R., 2001. Interfirm rivalry and managerial complexity: A conceptual framework of alliance failure. *Organization science,* 12(1), pp. 37-53

PARK, W., RO, Y.K. and KIM, N., 2018. Architectural innovation and the emergence of a dominant design: The effects of strategic sourcing on performance. *Research Policy,* 47(1), pp. 326-341

PARKHE, A., 1993. Strategic alliance structuring: A game theoretic and transaction cost examination of interfirm cooperation. *Academy of management journal,* 36(4), pp. 794-829

PATTON, M.Q., 2002. Two decades of developments in qualitative inquiry: A personal, experiential perspective. *Qualitative social work,* 1(3), pp. 261-283

PELLEGRIN-BOUCHER, E., LE ROY, F. and GURĂU, C., 2013. Coopetitive strategies in the ICT sector: typology and stability. *Technology Analysis & Strategic Management,* 25(1), pp. 71-89

PENG, T.A. and BOURNE, M., 2009. The Coexistence of Competition and Cooperation between Networks: Implications from Two Taiwanese Healthcare Networks*. *British Journal of Management,* 20(3), pp. 377-400

PETTER, S., STRAUB, D.W. and RAI, A., 2007. Specifying formative constructs in information systems research.

PFEFFER, J. and SALANCIK, G.R., 1978. The external control of organizations: A resource dependence approach. *NY: Harper and Row Publishers,*

PHAM, L., 2018. A Review of key paradigms: positivism, interpretivism and critical inquiry. *University of Adelaide,*

PITELIS, C., 2005. Edith Penrose, organisational economics and business strategy: an assessment and extension. *Managerial and Decision Economics,* 26(2), pp. 67-82

PLÜMPER, T. and NEUMAYER, E., 2012. Model uncertainty and robustness tests: Towards a new logic of statistical inference. *Available at SSRN 2129113,*

PODSAKOFF, P.M. et al., 2003. Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of applied psychology,* 88(5), pp. 879

POOLE, M.S. and VAN DE VEN, ANDREW H, 1989. Using paradox to build management and organization theories. *Academy of management review,* 14(4), pp. 562-578

PORTER, M.E., 1980. Competitive strategy: techniques for analyzing industries and competitors.

POULSEN, M.J., 2001. Competition and cooperation: what roles in scientific dynamics? *International Journal of Technology Management,* 22(7), pp. 782-793

POWELL, W.W., KOPUT, K.W. and SMITH-DOERR, L., 1996. Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly,* , pp. 116-145

PRAKASH, A. and DESHMUKH, S., 2010. Horizontal collaboration in flexible supply chains: a simulation study. *Journal of Studies on Manufacturing,* 1(1), pp. 54-58

PRESTON, C.C. and COLMAN, A.M., 2000. Optimal number of response categories in rating scales: reliability, validity, discriminating power, and respondent preferences. *Acta Psychologica,* 104(1), pp. 1-15

PROVAN, K.G., FISH, A. and SYDOW, J., 2007. Interorganizational networks at the network level: A review of the empirical literature on whole networks. *Journal of management,* 33(3), pp. 479-516

PROVAN, K.G. and KENIS, P., 2008. Modes of network governance: Structure, management, and effectiveness. *Journal of public administration research and theory,* 18(2), pp. 229-252

PROVAN, K.G. and SYDOW, J., 2008. Evaluating inter-organizational relationships. *CROPPER, S.; EBERS, M.; HUXHAM, C,* , pp. 691-716

PURANAM, P. and VANNESTE, B.S., 2009. Trust and governance: Untangling a tangled web. *Academy of Management Review,* 34(1), pp. 11-31

QUINN, R.E., 1977. Coping with cupid: The formation, impact, and management of romantic relationships in organizations. *Administrative Science Quarterly,* , pp. 30-45

QUINTANA-GARCIA, C. and BENAVIDES-VELASCO, C.A., 2004. Cooperation, competition, and innovative capability: a panel data of European dedicated biotechnology firms. *Technovation,* 24(12), pp. 927-938

RADHAKRISHNA, R.B., 2007. Tips for developing and testing questionnaires/instruments. *Journal of Extension,* 45(1), pp. 1TOT2

RADZIWON, A., BOGERS, M. and BILBERG, A., 2017. Creating and capturing value in a regional innovation ecosystem: A study of how manufacturing SMEs develop collaborative solutions. *International Journal of Technology Management,* , pp. 75.1-75.4

RAND, D.G. and NOWAK, M.A., 2013. Human cooperation. *Trends in cognitive sciences,* 17(8), pp. 413-425

RANDOLPH, ROBERT VAN DE GRAAFF, 2016. A multilevel study of structural resilience in interfirm collaboration: A network governance approach. *Management Decision,* 54(1), pp. 248-266

RAVERT, R.D., GOMEZ-SCOTT, J. and DONNELLAN, M.B., 2015. Equivalency of paper versus tablet computer survey data. *Educational Researcher,* 44(5), pp. 308-310

RAZA-ULLAH, T. andBENGTSSON, M., 2013. Tension in paradoxical relationships between firms. *29th EGOS Colloquium.*

RAZA-ULLAH, T., BENGTSSON, M. and KOCK, S., 2014. The coopetition paradox and tension in coopetition at multiple levels. *Industrial Marketing Management,* 43(2), pp. 189-198

RAZA-ULLAH, T., BENGTSSON, M. and VANYUSHYN, V., 2018. Coopetition capability: what is it? *Routledge Companion to Coopetition Strategies,* , pp. 197-204

RENNA, P. and ARGONETO, P., 2012. Capacity investment decision in co-opetitive network by information sharing. 62(1), pp. 359-367

REUER, J.J. and ZOLLO, M., 2005. Termination outcomes of research alliances. *Research Policy,* 34(1), pp. 101-115

REY, P. and TIROLE, J., 2013. Cooperation vs. collusion: how essentiality shapes co-opetition. *IDEI, WP,* 801

RIBEIRO-SORIANO, D.E., ROIG-TIERNO, N. and MAS-TUR, A., 2016. Governance models of coopetition and innovation: the case of Spanish firms. *International Journal of Technology Management,* 71(1-2), pp. 38-57

RICHARDS, L., 2014. *Handling qualitative data: A practical guide.* Sage.

RICHARDS, T.J. and RICHARDS, L., 1994. Using computers in qualitative research. *Handbook of qualitative research,* 2, pp. 445-462

RICHARDSON, G.B., 1972. The organisation of industry. *The economic journal,* 82(327), pp. 883-896

RITALA, P., 2012. Coopetition strategy–when is it successful? Empirical evidence on innovation and market performance. *British Journal of Management,* 23(3), pp. 307-324

RITALA, P., GOLNAM, A. and WEGMANN, A., 2014. Coopetition-based business models: The case of Amazon. com. *Industrial Marketing Management,* 43(2), pp. 236-249

RITALA, P. and HURMELINNA-LAUKKANEN, P., 2009. What's in it for me? Creating and appropriating value in innovation-related coopetition. *Technovation,* 29(12), pp. 819-828

RITALA, P., HURMELINNA-LAUKKANEN, P. and BLOMQVIST, K., 2009. Tug of war in innovation–coopetitive service development. *International Journal of Services Technology and Management,* 12(3), pp. 255-272

RITALA, P., KRAUS, S. and BOUNCKEN, R.B., 2016. Introduction to coopetition and innovation: contemporary topics and future research opportunities. *International Journal of Technology Management,* 71(1-2), pp. 1-9

RITALA, P., KRAUS, S. and BOUNCKEN, R.B., 2016. Introduction to coopetition and innovation: contemporary topics and future research opportunities. *International Journal of Technology Management,* 71(1-2), pp. 1-9

RITALA, P., KRAUS, S. and BOUNCKEN, R.B., 2016. Introduction to coopetition and innovation: contemporary topics and future research opportunities. *International Journal of Technology Management,* 71(1-2), pp. 1-9

RITTER, T. and GEMÜNDEN, H.G., 2003. Interorganizational relationships and networks: An overview. *Journal of business research,* 56(9), pp. 691-697

ROBERT, M. et al., 2018. Better, faster, stronger, the impact of market oriented coopetition on product commercial performance. *M@ n@ gement,* 21(1), pp. 574-610

ROBSON, M.J. et al., 2019. Alliance capabilities, interpartner attributes, and performance outcomes in international strategic alliances. *Journal of World Business,* 54(2), pp. 137-153

ROEHRICH, J.K. et al., 2019. Inter-organizational governance: a review, conceptualisation and extension. *Production Planning & Control,* , pp. 1-17

ROIG-TIERNO, N., KRAUS, S. and CRUZ, S., 2018. *The relation between coopetition and innovation/entrepreneurship,*

ROSCOE, J.T., *Fundamental research statistics for the behavioral sciences [by] John T. Roscoe.*

ROTHAERMEL, F.T. and BOEKER, W., 2008. Old technology meets new technology: Complementarities, similarities, and alliance formation. *Strategic Management Journal,* 29(1), pp. 47-77

ROUX, S., 2010. Comparing the efficiency of competition strategy to coopetition strategy in managed care in South Africa.

RUNGE, S., SCHWENS, C. and SCHULZ, M., 2019. Sleeping with the Enemy: Coopetition, Innovation Performance, and the Role of Interpartner Symmetry. *Academy of Management Proceedings.* Academy of Management Briarcliff Manor, NY 10510. pp. 12695

RUSKO, R., 2011. Exploring the concept of coopetition: A typology for the strategic moves of the Finnish forest industry. *Industrial Marketing Management,* 40(2), pp. 311-320

RUSKO, R., 2014. Mapping the perspectives of coopetition and technology-based strategic networks: A case of smartphones . *Industrial Marketing Management,* 42(5), pp. 801-812

RYAN, A., 2006. Post-Positivist approaches to research Researching and Writing your thesis: A guide for postgraduate students (pp. 12-26). *Maynooth, ON: Maynooth Adult and Community Education,*

SAHLAN, M.K., ABU-HUSSIN, M.F. and HEHSAN, A., 2019. Market coopetition. *Journal of Islamic Marketing,*

SALAM, M.A. and SALAM, M.A., 2017. The mediating role of supply chain collaboration on the relationship between technology, trust and operational performance: An empirical investigation. *Benchmarking: An International Journal,* 24(2), pp. 298-317

SANDELOWSKI, M., 2010. What's in a name? Qualitative description revisited. *Research in nursing & health,* 33(1), pp. 77-84

SAPSFORD, R. and JUPP, V., 2006. *Data Collection and Analysis.* SAGE.

SCHIAVONE, F. and SIMONI, M., 2011. An experience-based view of co-opetition in R&D networks. *European Journal of Innovation Management,* 14(2), pp. 136-154

SCHILKE, O. and COOK, K.S., 2015. Sources of alliance partner trustworthiness: Integrating calculative and relational perspectives. *Strategic Management Journal,* 36(2), pp. 276-297

SCHILKE, O. and GOERZEN, A., 2010. Alliance management capability: an investigation of the construct and its measurement. *Journal of Management,* 36(5), pp. 1192-1219

SCHLEYER, T.K. and FORREST, J.L., 2000. Methods for the design and administration of web-based surveys. *Journal of the American Medical Informatics Association,* 7(4), pp. 416-425

SCHLOMER, G.L., BAUMAN, S. and CARD, N.A., 2010. Best practices for missing data management in counseling psychology. *Journal of Counseling psychology,* 57(1), pp. 1

SCHREINER, M., KALE, P. and CORSTEN, D., 2009. What really is alliance management capability and how does it impact alliance outcomes and success? *Strategic Management Journal,* 30(13), pp. 1395-1419

SCHUMPETER, J., 1942. Creative destruction. *Capitalism, socialism and democracy,* 825, pp. 82-85

SCHWEINFURTH, M.K. and TABORSKY, M., 2018. Relatedness decreases and reciprocity increases cooperation in Norway rats. *Proceedings of the Royal Society B: Biological Sciences,* 285(1874), pp. 20180035

SCOTT, S.G. and BRUCE, R.A., 1994. Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of management journal,* 37(3), pp. 580-607

SEGRESTIN, B., 2005. Partnering to explore: The Renault–Nissan Alliance as a forerunner of new cooperative patterns. *Research policy,* 34(5), pp. 657-672

SEKARAN, U., 2009. Research methods for business 4th edition. Hoboken.

SHELTON, P.J., 2000. *Measuring and improving patient satisfaction.* Jones & Bartlett Learning.

SHEN, Z., 2007. Integrated supply chain design models: a survey and future research directions. *Journal of Industrial and Management Optimization,* 3(1), pp. 1

SIJTSMA, K., 2009. On the use, the misuse, and the very limited usefulness of Cronbach's alpha. *Psychometrika,* 74(1), pp. 107

SIMANDAN, D., 2018. Competition, contingency, and destabilization in urban assemblages and actor-networks. *Urban Geography,* 39(5), pp. 655-666

SIMCHI-LEVI, D., KAMINSKY, P. and SIMCHI-LEVI, E., 2004. *Managing the Supply Chain: Definitive Guide.* Tata McGraw-Hill Education.

SMITH, M., 2019. *Research methods in accounting.* SAGE Publications Limited.

SMITH, P.W., BERRINGTON, A. and STURGIS, P., 2009. A comparison of graphical models and structural equation models for the analysis of longitudinal survey data. *Methodology of longitudinal surveys,* , pp. 381-392

SMITH, W.K. and LEWIS, M.W., 2011. Toward a theory of paradox: A dynamic equilibrium model of organizing. *Academy of Management Review,* 36(2), pp. 381-403

SONG, D. and LEE, E., 2012. Coopetitive networks, knowledge acquisition and maritime logistics value. *International Journal of Logistics Research and Applications,* 15(1), pp. 15-35

SPENS, K.M. and KOVÁCS, G., 2006. A content analysis of research approaches in logistics research. *International Journal of Physical Distribution & Logistics Management,* 36(5), pp. 374-390

SRIVASTAVA, M.K., BRUYAKA, O. and GNYAWALI, D.R., 2012. Overcoming innovation barriers: Alliance portfolio characteristics and technological innovations. *Contemporary Perspectives on Technological Innovation, Management and Policy,* 1(1), pp. 121–156

STADTLER, L. and LIN, H., 2017. Moving to the next strategy stage: examining firms' awareness, motivation and capability drivers in environmental alliances. *Business Strategy and the Environment,* 26(6), pp. 709-730

STEVENSON, M. and SPRING, M., 2007. Flexibility from a supply chain perspective: definition and review. *International journal of operations & production management,* 27(7), pp. 685-713

STRESE, S. et al., 2016. Organizational antecedents of cross-functional coopetition: The impact of leadership and organizational structure on cross-functional coopetition. *Industrial Marketing Management,* 53, pp. 42-55

SURESH, S., 2014. *Nursing research and statistics.* Elsevier Health Sciences.

SWAB, R.G. and JOHNSON, P.D., 2019. Steel sharpens steel: A review of multilevel competition and competitiveness in organizations. *Journal of Organizational Behavior,* 40(2), pp. 147-165

TABACHNICK, B. and FIDELL, L., 2014. Using multivariate statistics . Harlow.

TANGPONG, C., HUNG, K. and RO, Y.K., 2010. The interaction effect of relational norms and agent cooperativeness on opportunism in buyer–supplier relationships. *Journal of Operations Management,* 28(5), pp. 398-414

TASHAKKORI, A., TEDDLIE, C. and KERVIN, J., 2000. Mixed methodology: combining qualitative & quantitative approaches. *Relations Industrielles,* 55(3), pp. 539

TAYLOR, M., 1987. The possibility of cooperation.

TEECE, D.J., 1986. Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. *Research policy,* 15(6), pp. 285-305

TEECE, D.J., 1986. Transactions cost economics and the multinational enterprise An Assessment. *Journal of Economic Behavior & Organization,* 7(1), pp. 21-45

TEECE, D.J., 2006. Reflections on "profiting from innovation". *Research Policy,* 35(8), pp. 1131-1146

TEECE, D.J., PISANO, G. and SHUEN, A., 1997. Dynamic capabilities and strategic management. *Strategic Management Journal,* 18(7), pp. 509-533

TEIXEIRA, J., 2014. Understanding Coopetition in the Open-Source Arena: The Cases of WebKit and OpenStack. *Proceedings of The International Symposium on Open Collaboration.* ACM. pp. 39

TETHER, B.S., 2002. Who co-operates for innovation, and why: an empirical analysis. *Research policy,* 31(6), pp. 947-967

THØGER CHRISTENSEN, L., 2002. Corporate communication: The challenge of transparency. *Corporate Communications: An International Journal,* 7(3), pp. 162-168

THOMSON, A.M., PERRY, J.L. and MILLER, T.K., 2007. Conceptualizing and measuring collaboration. *Journal of Public Administration Research and Theory,* 19(1), pp. 23-56

THREATTE, R.M. et al., 1979. Use of an iodide-specific electrode to study lactoperoxidase-catalyzed iodination of l-tyrosine. *Journal of pharmaceutical sciences,* 68(12), pp. 1530-1534

TIAN YU-YING, HUANG CHANG-SHENG AND LI NING, 2014. Studies on Co-opetition among National Petroleum Companies in China. *Research Journal of Applied Sciences, Engineering and Technology,* 5(11), pp. 3204-3211

TIDSTRÖM, A., 2008. Perspectives on coopetition on actor and operational levels. *Management Research: Journal of the Iberoamerican Academy of Management,* 6(3), pp. 207-217

TIDSTRÖM, A., 2009. Causes of conflict in intercompetitor cooperation. *Journal of Business & Industrial Marketing,* 24(7), pp. 506-518

TIDSTRÖM, A., 2014. Managing tensions in coopetition. *Industrial Marketing Management,* 43(2), pp. 261-271

TIDSTRÖM, A. and RAJALA, A., 2016. Coopetition strategy as interrelated praxis and practices on multiple levels. *Industrial Marketing Management,* 58, pp. 35-44

TROCHIM, W.M., 2006. Qualitative measures. *Research measures knowledge base,* 361, pp. 2-16

TSAI, W., 2002. Social structure of "coopetition" within a multiunit organization: Coordination, competition, and intraorganizational knowledge sharing. *Organization science,* 13(2), pp. 179-190

TULI, F., 2010. The basis of distinction between qualitative and quantitative research in social science: Reflection on ontological, epistemological and methodological perspectives. *Ethiopian Journal of Education and Sciences,* 6(1),

TWI, 2019. *Joint industry projects.* [online] UK: TWI. Available from: https://www.twi-global.com/what-we-do/research-and-technology/current-research-programmes/joint-industry-projects#/ [Accessed June 2019]

UK ECONOMIC OUTLOOK, 2015. *UK Economic Outlook.* pwc.

UK OFFSHORE OPERATORS ASSOCIATION., 2004. *Maximizing Britain's oil and gas resources.* UK: UKOOA.

ULLMAN, J.B., 2006. Structural equation modeling: Reviewing the basics and moving forward. *Journal of personality assessment,* 87(1), pp. 35-50

ULLMAN, J.B. and BENTLER, P.M., 2003. Structural equation modeling. *Handbook of psychology,* , pp. 607-634

VALMAR GROUP. 2019. [online] UK: Valmar Group. Available from: https://www.valmargroup.co.uk/fpal [Accessed June 2019]

VAN SELM, M. and JANKOWSKI, N.W., 2006. Conducting online surveys. *Quality and quantity,* 40(3), pp. 435-456

VANDAELE, D. et al., 2007. How to govern business services exchanges: Contractual and relational issues. *International Journal of Management Reviews,* 9(3), pp. 237-258

VANGEN, S. and HUXHAM, C., 2011. The tangled web: unraveling the principle of common goals in collaborations. *Journal of Public Administration Research and Theory,* 22(4), pp. 731-760

VANYUSHYN, V. et al., 2018. International coopetition for innovation: Are the benefits worth the challenges? *Review of Managerial Science,* 12(2), pp. 535-557

VENKATESH, V., BROWN, S.A. and BALA, H., 2013. Bridging the qualitative-quantitative divide: Guidelines for conducting mixed methods research in information systems. *MIS Quarterly,* 37(1), pp. 21-54

VERGARA, R.A.G., Samsung Electronics and Apple, Inc.: A Study in Contrast in Vertical Integration in the 21 st Century.

VERGARA, R.A.G., Samsung electronics and apple, inc.: A study in contrast in vertical integration in the 21st century.

VOLSCHENK, J., UNGERER, M. and SMIT, E., 2016. Creation and appropriation of socio-environmental value in coopetition. *Industrial Marketing Management,* 57, pp. 109-118

VOSS, K.E. et al., 2019. Integrating reciprocity into a social exchange model of inter-firm B2B relationships. *Journal of Business & Industrial Marketing,*

WALLEY, K., 2007. Coopetition: an introduction to the subject and an agenda for research. *International Studies of Management & Organization,* 37(2), pp. 11-31

WANG, E.T. and WEI, H., 2007. Interorganizational governance value creation: coordinating for information visibility and flexibility in supply chains. *Decision Sciences,* 38(4), pp. 647-674

WANG, W. et al., 2018. Towards Cooperation in Sequential Prisoner's Dilemmas: a Deep Multiagent Reinforcement Learning Approach. *arXiv preprint arXiv:1803.00162,*

WANG, X., 2018. *Developing and improving a coopetition design for learning,*

WANG, Y. and RAJAGOPALAN, N., 2015. Alliance capabilities: review and research agenda. *Journal of management,* 41(1), pp. 236-260

WASSMER, U., 2010. Alliance portfolios: A review and research agenda. *Journal of management,* 36(1), pp. 141-171

WASSON, C.R., 1978. *Dynamic competitive strategy & product life cycles.* Austin Press.

WELLINGTON, J. and SZCZERBINSKI, M., 2007. *Research methods for the social sciences.* A&C Black.

WESTON, R. and GORE JR, P.A., 2006. A brief guide to structural equation modeling. *The counseling psychologist,* 34(5), pp. 719-751

WHEELEN, T.L. et al., 2017. *Strategic management and business policy.* pearson.

WILHELM, M. and SYDOW, J., 2018. Managing coopetition in supplier networks–A paradox perspective.
. *Journal of Supply Chain Management,* 54(3), pp. 22-41

WILHELM, M.M., 2011. Managing coopetition through horizontal supply chain relations: linking dyadic and network levels of analysis. *Journal of Operations Management,* 29(7), pp. 663-676

WILHELM, M.M. and KOHLBACHER, F., 2011. Co-opetition and knowledge co-creation in Japanese supplier-networks: The case of Toyota. *Asian Business & Management,* 10(1), pp. 66-86

WILHELM, M. and SYDOW, J., 2018. Managing Coopetition in Supplier Networks–A Paradox Perspective. *Journal of Supply Chain Management,*

WILKINSON, I. and YOUNG, L., 2002. On cooperating: firms, relations and networks. *Journal of Business Research,* 55(2), pp. 123-132

WILLIAMSON, O.E., 1975. Markets and hierarchies. *New York,* 2630

WILLIAMSON, O.E., 1985. The economic institutions of capitalism: Firms. *Markets, Relational Contracting, New York, ,* pp. 26ff

WILLIAMSON, O.E., 1987. Transaction cost economics: The comparative contracting perspective. *Journal of economic behavior & organization,* 8(4), pp. 617-625

WILSON, D.B. et al., 1976. Specific selection of cytotoxic effector cells: the generation of cytotoxic T cells in rat thoracic duct lymphocyte populations positively or negatively selected for reactivity to specific strong histocompatibility alloantigens. *Journal of immunology (Baltimore, Md.: 1950),* 116(6), pp. 1624-1628

WOLFF, S., 2016. *Coopetition in supply management, a means to increasing a company's competitiveness,*

WOOD, I., 2014. *UKCS maximising recovery review: final report.* United Kingdom: UK Government.

WOOLTHUIS, R.K., HILLEBRAND, B. and NOOTEBOOM, B., 2005. Trust, contract and relationship development. *Organization Studies,* 26(6), pp. 813-840

WRIGHT, K.B., 2005. Researching Internet-based populations: Advantages and disadvantages of online survey research, online questionnaire authoring software packages, and web survey services. *Journal of computer-mediated communication,* 10(3), pp. JCMC1034

WU, J., 2012. Technological collaboration in product innovation: The role of market competition and sectoral technological intensity. *Research Policy,* 41(2), pp. 489-496

YAMI, S. et al., 2010. *Coopetition: winning strategies for the 21st century.* Edward Elgar Publishing.

YAMI, S. and NEMEH, A., 2014. Organizing coopetition for innovation: The case of wireless telecommunication sector in Europe. *Industrial Marketing Management,* 43(2), pp. 250-260

YANG, Z., ZHOU, C. and JIANG, L., 2011. When do formal control and trust matter? A context-based analysis of the effects on marketing channel relationships in China. *Industrial Marketing Management,* 40(1), pp. 86-96

YIN, R.K., 1994. Discovering the future of the case study. Method in evaluation research. *Evaluation practice,* 15(3), pp. 283-290

YIN, R.K., 2017. *Case study research and applications: Design and methods.* Sage publications.

YONG, L. et al., 2014. Choice of alliance structures when allying with competitors: Matching structures to alliance resources and risks. *Human Systems Management,* 33(3), pp. 79-89

YOU, J. et al., 2018. Uncertainty, opportunistic behavior, and governance in construction projects: The efficacy of contracts. *International Journal of Project Management,* 36(5), pp. 795-807

ZACHARIA, Z. et al., 2019. The emerging role of coopetition within inter-firm relationships. *The International Journal of Logistics Management,* 30(2), pp. 414-437

ZAHEER, A. and VENKATRAMAN, N., 1995. Relational governance as an interorganizational strategy: An empirical test of the role of trust in economic exchange. *Strategic Management Journal,* 16(5), pp. 373-392

ZAHEER, A. and HARRIS, J., 2006. Interorganizational trust. *Handbook of Strategic Alliances.* SAGE Publications Inc. pp. 169-198

ZENG, M., 2003. Managing the cooperative dilemma of joint ventures: the role of structural factors. *Journal of International Management,* 9(2), pp. 95-113

ZERBINI, F. and CASTALDO, S., 2007. Stay in or get out the Janus? The maintenance of multiplex relationships between buyers and sellers. *Industrial Marketing Management,* 36(7), pp. 941-954

ZHANG, J. and FRAZIER, G.V., 2011. Strategic alliance via co-opetition: Supply chain partnership with a competitor. *Decision Support Systems,* 51(4), pp. 853-863

ZHAO, X., LYNCH JR, J.G. and CHEN, Q., 2010. Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of consumer research,* 37(2), pp. 197-206

ZHONG, W. et al., 2017. Trust in interorganizational relationships: A meta-analytic integration. *Journal of Management,* 43(4), pp. 1050-1075

ZHOU, H. and BENTON JR, W., 2007. Supply chain practice and information sharing. *Journal of Operations Management,* 25(6), pp. 1348-1365

ZIKMUND, W., 2000. G.(2000). *Business research methods,* 6

ZOLLO, M. and WINTER, S.G., 2002. Deliberate learning and the evolution of dynamic capabilities. *Organization science,* 13(3), pp. 339-351

APPENDICES
Appendix 1: Coopetition Typologies

Several typologies have been proposed in management literature to characterise the coopetition strategy. Dowling et al., (1996), proposed a typology for coopetition, based on the nature of competition that exists among the partners. The types are buyers and suppliers in 1) direct and 2) indirect competition. The first typology refers to coopetition, that exists when competing organisations are involved in a partnership, such as licensing agreements or JV for added value creations. For example, when organisations collaborate to tackle counter competitive threats from other sources. The second typology refers to relationships that occur among firms that are not in direct competition with each other in the marketplace but compete in other areas. For example, lobbying or legal actions are not sources of direct competition to the firm's operations but can pose a threat.

Similarly, through an investigation of the evolution of coopetitive projects in ERP (enterprise resource planning) industries, Pellegrin-Boucher et al., (2013), uncovered some dynamic aspects of coopetition typologies. They distinguished between coopetition 1) with vertical organisations and 2) between horizontal organisations. They investigated the issue of market rivalry and coopetition; from the vertical perspective, coopetition between two firms with one firm attacking the market of their partners while still in the relationship and horizontally, when competing firms collaborate in value-adding chain of activities, before and after the phase in which they directly compete, joining resources and competencies in the same area of expertise (Figure 0.1).
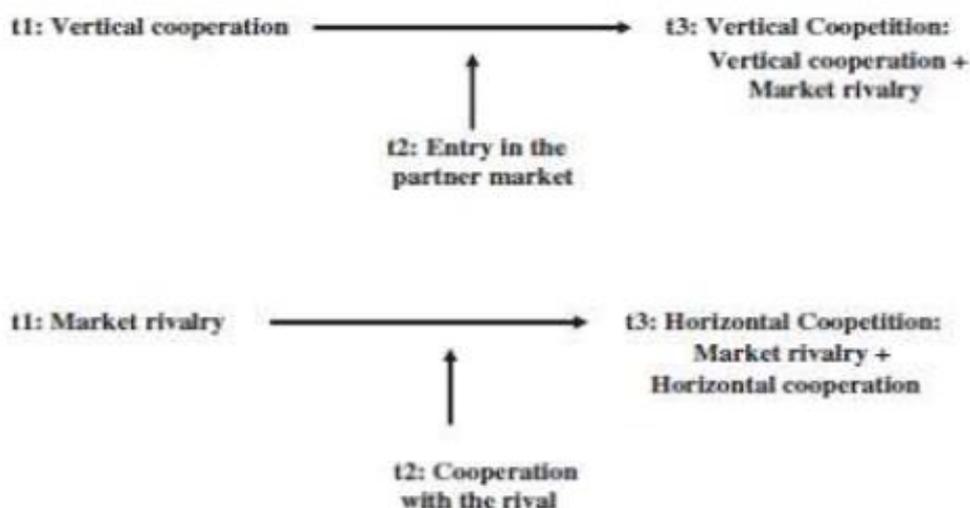
Figure 0.1: Typology of Dyadic Coopetitive Agreements in ERP Industry (Pellegrin-Boucher et al., 2013 p. 85)

Furthermore, Dagnino and Padula (2002), proposed four coopetition typologies following their studies of the automobile industry, which are: Dyadic and network (simple or complex) (Table 0.1). Simple dyadic coopetition refers to the relationship that occurs between two competing organisations along a single level of the value chain, while complex dyadic coopetition occurs between two competing organisations along several levels of the value chain. Similarly, simple network coopetition refers to the relationship among several competing organisations along one level of the value chain, e.g. parallel sourcing, while complex network coopetition occurs among multiple organisations along several levels of the value chain, e.g., industrial districts, firm cluster and multilateral agreements.

		Number of firms	
		Two	**More than two**
Number of activities in the value chain	**One**	Simple Dyadic Coopetition	Simple Network Coopetition
	Multiple	Complex Dyadic Coopetition	Complex Network Coopetition

Table 0.1: Types of Coopetition (Dagnino and Padula, 2002 p.15)

Additionally, typologies were proposed by Carayannis and Alexander (2003), while reviewing SEMATECH program, they realised that coopetition could be induced and sustained forcefully, based on factors such as public funding and institutional forces. Meanwhile, Marina (2007), discovered emergent coopetition in Italian opera houses, where the coopetition strategy occurred unintentionally resulting from cooperation being imposed on organisations by policymakers. This typology stresses the role of strategic learning, as it was a self-enforcing mechanism that induced coopetition to an emergent or deliberate one. This typology is interesting, as this study assumes that, since the OGI is highly competitive, coopetition may occur unintentionally, especially within organisations in collaborative endeavours. Therefore this study would further explore the notion of emergent coopetition and how it differs from coopetition that arises as a deliberate strategy.

Luo (2007), proposed typologies for coopetition based on the intensity of the competition and cooperation that occurs between the partners. He suggests that a multinational enterprise (MNE) may find itself in one of four situations regarding coopetition. I) A Contending

Situation, which is characterised by high competition and low cooperation, this form of coopetition occurs when one organisation competes with others for market power, competitive position and market share in international markets. II) An Isolating Situation, characterised by low competition and low cooperation, here, the rate of interactions with other organisations are low, the organisation acts independent in the international market, streamlining its investments and operations by itself. III) A Partnering Situation; characterised by little competition and high cooperation, this occurs amongst organisations searching for joint synergies, created by the player's complementary resources and capabilities. The conditions necessary for partnering situation to occur are high resource complementarity and low market commonalities. Finally, IV) An Adapting Situation, characterised by high competition and high cooperation, this happens when the partnering organisations mutually depend on each other to achieve their goals (Figure 0.2).
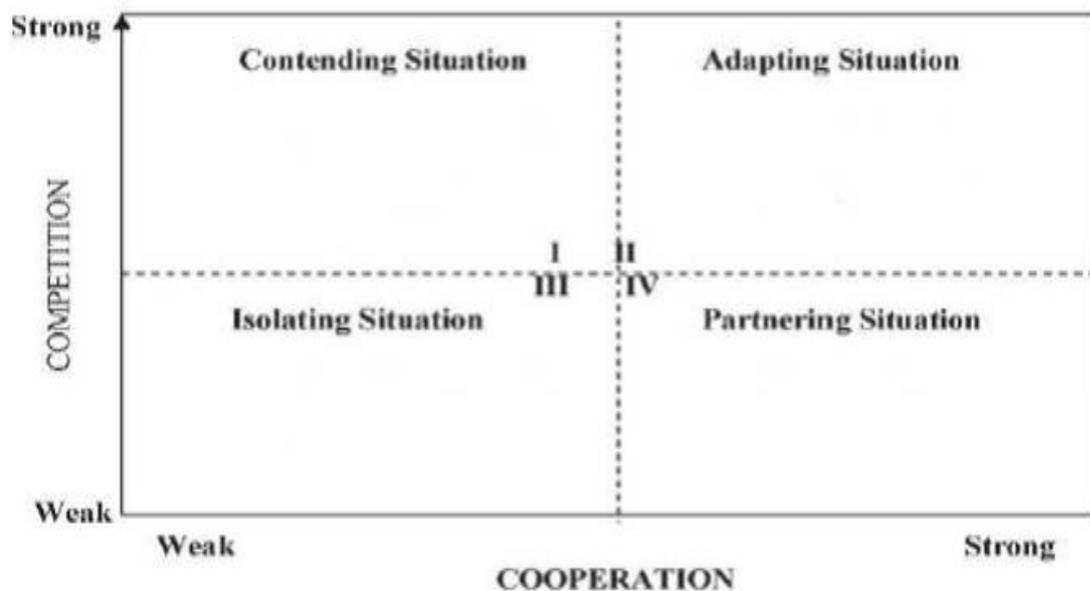
Figure 0.2: Intensity of coopetition with a global rival (Luo, 2007 p. 136)

The typology shares similarities to, Bengtsson and Kock (2000)'s proposed typology, where they suggested that the intensity of a coopetitive relationship can be equal (low competition and cooperation and high competition and cooperation), highly cooperative or highly competitive. Hence, for originality, Luo (2007), in addition to the global dimension, proposed

a second typology that includes geographical breadth (i.e. number of foreign markets) and rivalrous breadth (i.e. the number of rivals in coopetition). The four situations in Luo (2007)'s second typology (Figure 0.3) are; I) A Dispersing Situation, which occurs when a global organisation, cooperates with smaller numbers of global rivals in a wide array of the international market. II) A Concentrating Situation exists when coopetition is between a small number of competitors in the international market. III) A Connecting Situation occurs when an MNE cooperates with a large number of rivals but in a few concentrated markets. While IV) A Networking Situation arises when a global organisation cooperates with a large number of global competitors in a large number of the international market.
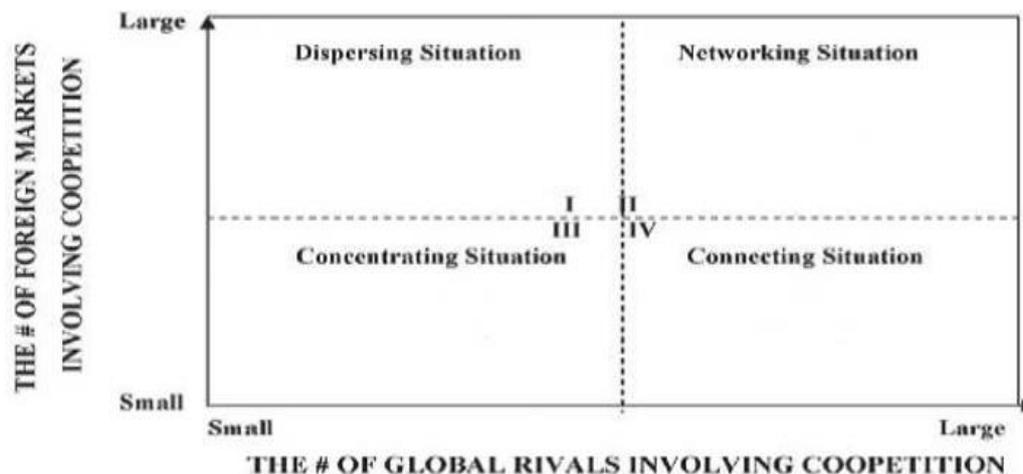
Figure 0.3: *Diversity of Coopetition with Multiple Global Rivals (Luo, 2007 p.139)*

Another typology proposed by Gnyawali et al., (2008), classifies coopetition strategy according to the axis of a business relationship, the number of parties involved, the level of analysis and the locus of cooperation and competition (Table 0.2). Here, the axis of a business relationship refers to coopetition occurring either vertically (adjacent to each other in the value chain) or horizontally (rivals at the same level in the value chain), while the number of players differentiates between coopetition among two players (dyadic) or coopetition among multiple players. Level of analysis involves, coopetition occurring in the firm, dyad or network level, whereas, the locus of coopetition, deals with spatial and temporal collocated or separated competitive and cooperative parts of the relationship. Temporally and spatially disposed

coopetition refers to cooperation and competition in the same domain, while temporally and spatially separated coopetition relates to collaboration and competition occurring in different domains.

Locus of coopetition		Coopetition Axis	
		Vertical	Horizontal
Dyadic (Same firm)	Temporally and Spatially co-located	Coopetition between players who are vertically adjacent to each other in the industry value chain and who compete and collaborate in the same domain.	Coopetition between players who are rivals at the same stage in the industry value chain and who compete and collaborate in the same domains.
	Temporally and Spatially separate	Coopetition between players who are vertically adjacent to each other in the industry value chain and who compete in one domain and collaborate in another.	Coopetition between players who are rivals at the same stage in the industry value chain and who compete in one domain and collaborate in another.
Multiple Firms		Coopetition between players who are vertically adjacent to each other in the industry value chain and who collaborate to compete with rivals, pairs or groups.	Coopetition between players who are rivals at the same stage in the industry value chain and collaborate to compete with rivals pairs or groups.

Table 0.2: Framework for understanding coopetition (Gnywali et al., 2008)

As mentioned above and in parallel with coopetition on two continua (refer to page 47), Bengtsson et al., (2010), typified coopetition based on the level of intensity of the cooperative or competitive elements, suggesting that coopetition can either be equal, cooperation dominant or competition dominant. Accordingly, weak competition and cooperation signify weak

interactions between the coopeting parties; similarly, strong competition and cooperation imply, intense interactions between the parties involved, on both the competing and cooperating elements. Thus, indicating tensions between competitors, with a high degree of hostility as well as high actions and reactions in the relationship. Cooperation dominated coopetition suggest weak interactions with weak tensions and limited dynamics, while competition dominated coopetition suggests strong tensions among the parties.

In addition, Rusko (2011) proposed a combined, two-dimensional typology, based on the stages of the supply chain and the degree of external (or internal) coopetition (Table 0.3). On the one hand, the supply chain stages are divided into three forms of coopetition in line with (Bengtsson and Kock, 2000)'s typology, while the other axis, shows four main strategic domains of coopetition based on Luo (2004)'s modified typology. Thus, resulting in twelve various types of coopetition.

Types of Coopetition			Upstream moves Input activities/Cooperation		Downstream moves Output activities/Competition
			Typical, Cooperation dominated relationships	Equal Relationship	Typical, Competition dominated relationships
High	1)	Coopetition with rivals	Dyadic upstream and factor-based coopetition, with rivals without closeness of customer	Dyadic mid-stream coopetition, e.g., in semi-finished products, with competitors	Dyadic product-and market-based downstream coopetition with rivals, and with proximity of customer market
The degree of external coopetition	2)	Coopetition with a government	Multifaceted factor-based coopetition with rivals and a government	Multifaceted midstream coopetition with a government	Multifaceted downstream coopetition
	3)	Coopetition with alliance partners	Internal factor-based coopetition with alliance partners	Internal mid-stream coopetition with alliance partners	Internal downstream coopetition with alliance partners
Low	4)	Coopetition within a company	Intra-firm factor-based	Intra-firm mid-stream coopetition	Intra-firm downstream coopetition

Table 0.3: A combined Typology of Coopetition (Rusko, 2011 p. 314)

Another typology based on the amount of prior successful coopetition experience was proposed by Schiavone and Simoni (2011). This typology posits that organisations would much rather

engage in a coopetitive relationship with partners that have been had previous successful coopetition endeavours. Hence, organisations with minimal coopetition experience will adopt a conservative, with a preference for partners within a specific network with proven reliability (intra-network coopetition). Similarly, when the organisations acquire experiences with coopetition practices, they tend to move towards inter-network coopetition, seeing as they have enough experience to identify non-value adding relationships and are eager to attain the inherent benefits of coopetition. Subsequently, these experienced organisations would identify their best competitors and would attempt to form collaborative alliances, to achieve the best possible outcome, thus committing to a single partnership and avoid interactions with other networks. Therefore, reverting to intra-network coopetition (see Figure 0.4).
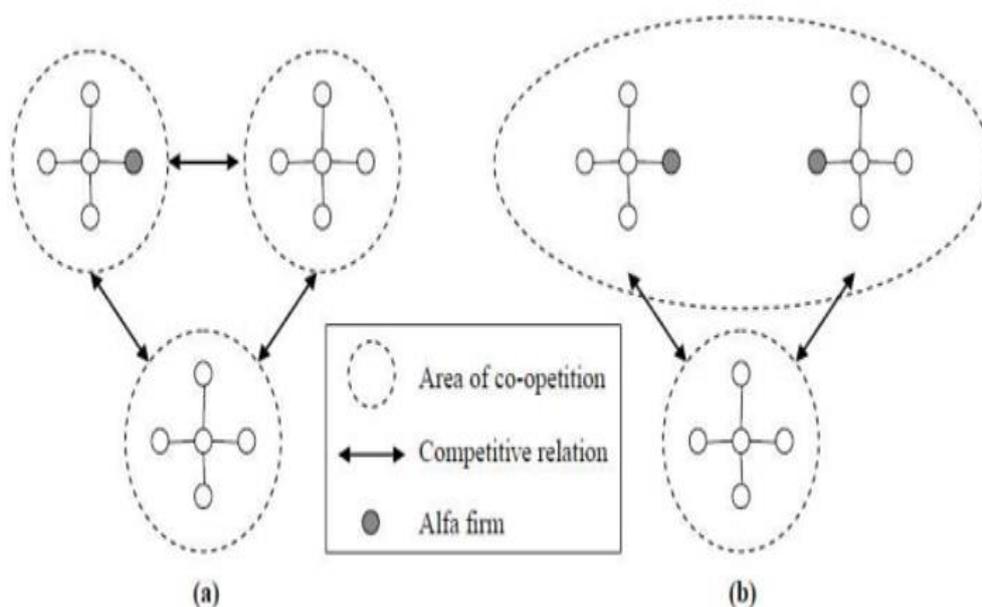
Figure 0.4: *The difference between Intra- and Inter-Network Coopetition (Schiavone and Simoni, 2011 p. 144)*

Furthermore, Golnam et al., (2014), proposes another coopetition typology, between and within value networks, based on the scope of coopetition in the value network and the nature of collaboration, summarised in (Figure 0.5). The range of coopetition here distinguishes between the occurrence of coopetition between different value network; referring to situations where coopetition exists outside a single value network, resulting in coopeting partners becoming more separate and within the same value network, referring to instances where coopetition occurs between parties in the same network (i.e. they have the same customer base). The nature

of collaboration in these context deals with either value co-creation and value leveraging. Value co-creation refers to coopetition with the aim of developing newer products or services to improve value for the consumers; these co-creations can involve several parties within the network, including, customers, competitors and suppliers. Whereas, value leveraging involves jointly creating value for the customers, which may otherwise not exist through the synergy and complementarities of resources, skills and capabilities.

Figure 0.5: Typology of coopetition within and between value networks (Golnam et al., 2014 p. 52)

Further typologies were presented by Czakon and Rognalski (2014), based on the behaviours of partners in a coopetitive relationship, concluding that nine instead of four types of coopetition can exist in a coopetitive relationship (Table 0.4). They also realised that forced coopetition results in passive behaviours and that active coopetition is driven mainly by resource interdependency, particularly when the parties engage in coopetition as a deliberate strategy. Even though this typology failed to define the characteristics of passive and active collaboration explicitly, it would be adopted to conceptualise emergent coopetition as the study has noted that coopetition that occurs as a forced or unintentional strategy is passive.

Coopetitors Mutual Interactions	Passive Collaboration	Passive and Active Collaboration	Active Collaboration
Passive Competition	Passive coopetition	Mixed coopetition – collaborative and passive interactions dominated	Mixed coopetition – active-passive
Passive and Active Competition	Mixed coopetition – competitive and passive interactions-dominated	Flexible coopetition	Mixed coopetition – competitive and active interactions-dominated
Active Competition	Mixed coopetition – passive-active	Mixed coopetition – collaborative and active interactions dominated	Active coopetition

Table 0.4: Models of coopetitive relationships based on passive/active behaviours (Czakon and Rogalski, 2014, p. 41).

Chiambaretto and Dumez, (2016), using a multilevel approach, identified seven forms of coopetition (Figure 0.6), emphasising the need to broaden the manner in which competitors are perceived in a coopetitive endeavour, as competitors can exist outside the traditional dyad level of analysis. They stressed the importance of carefully defining competitors, as the focus was mainly on direct competitors (horizontal), whereas, competitive threats exist on other levels, adding that a comprehensive review of coopetition helps combat the risks of opportunism in a coopetitive agreement.

Logical compression		Activity level		
		Purely horizontal	*Purely vertical*	*Combining horizontal and vertical*
Organizational level	Similar	Homogenous horizontal cooperation	-	Homogenous orthogonal cooperation
	Dissimilar	Heterogenous horizontal cooperation	-	Heterogenous orthogonal cooperation
	Mixt	Mixed horizontal cooperation	Mixed vertical cooperation	Mixed orthogonal cooperation
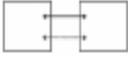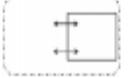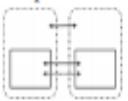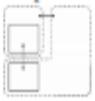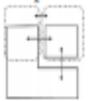
Figure 0.6: A typology of coopetition forms based on a multilevel approach (Chiambaretto and Dumez, 2016 p. 123)

These typologies are essential in this study to classify the coopetition relationships in the study, especially since it has been established that coopetition can occur as an emergent strategy, with the intensity of the opposing element defining the nature of coopetition. For instance, where organisations are forced into coopetition, the competition aspect of the alliance, maybe more active while the collaboration perspective would be passive. These typologies would help identify the nature of the coopetition alliance in the study.

Appendix 2:

STRUCTURAL EQUATION MODELLING OVERVIEW

Terminologies

In SEM analysis, there are some basic terminologies which would be used in subsequent chapters; hence, it is essential to describe these terms.

- Latent Variables

Latent variable, which is also known as unobserved, unmeasured or common variables are variables that are not directly observed; instead, they are inferred from other directly observed variables. The latent variable distinguishes SEM from other statistical analysis. This variable is based on the assumption that some constructs cannot be directly observed; for example, the notion of trust cannot be observed directly.

- Indicators and Error Terms

In SEM, the latent variables are measured through the use of observable variables, which are known as indicators. An example of an indicator is a question item in a questionnaire. These indicators may not be a perfect measurement of the latent variable but consist of the true variance that the indicator measures, and the error variance, resulting from the unmeasured factors. This can be represented in the following equation and diagrammatically in (Figure 0:7).

$$X = t + e$$

X = observed item

t = true score

e = error
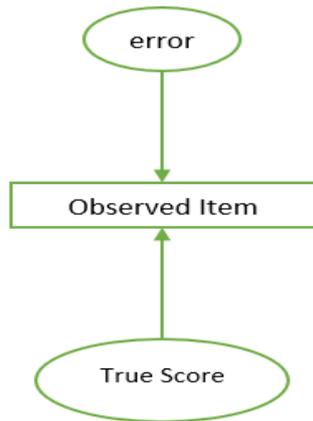
Figure 0:7: Composition of an observed items

From *Figure 0:7*, the arrows leading into the observed item shows the variance in the item can be explained by the true score and the error. It should be noted that when measuring a latent variable, more than one indicator should be used. The more indicator variable used to measure a latent variable, the more dimensions of the construct can be captured, which would, in turn, reduce the errors. Smith et al., (2009), adds that in SEM, for a model to be identified, more than one indicator should be used for its underlying latent construct.

Additionally, Bryne, (2016), adds that another type of error in SEM are associated with the dependent variables. Any variable which is caused or predicted by another variable has an error term associated with it, known as the disturbance in SEM. This error accounts for variances in the DV that is not explained by the predicated variable.

Endogenous Variables: They are variables that depend on other variables. i.e. they have arrows leading into them

Exogenous Variables: They are variables that independent and are not predicted by another variable, i.e. no arrows lead into them.

Notations and Symbols

In SEM, there are standard symbols used in the path diagram. The symbols (Figure 0:8), while not being mandatory are conventional and allows easy identification of the model by users and are adopted in this study.
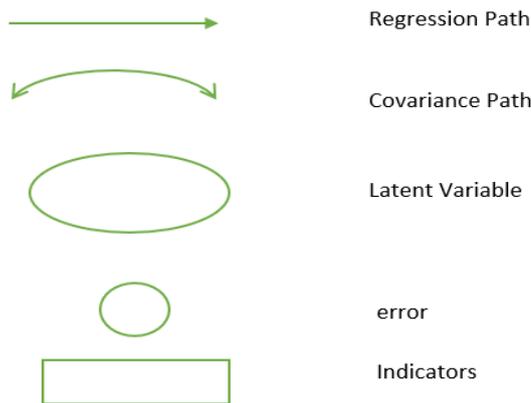
Figure 0:8 Symbols in SEM

<u>Variance-Covariance Matrix</u>

In structural equation modelling, raw data are usually not analysed directly; instead, the data are converted to a variance-covariance matrix of the observed variables, where the variance and multi-item correlation are presented in a tabular form. The aim of representing the data in this form to summarise them into a simpler underlying structure to allow easier comparison with the estimated parameters of an implied variance-covariance matrix based on the a priori specification of a structural model. Comparing the implied and observed matrices reveal the model fit since it shows whether the observed data fit well with the implied model. The methods of estimation would be discussed further in this section.

Structural Model

In order to conduct SEM analyses, the hypothesised model describing the interactions among latent constructs are represented with a structural model; hence, a structural model is a conceptual model with the hypothesis clearly defined (Kline, 2015). Put simply; this model relates variables or factors to one another. Structural models are further subcategorised in two primary categories based on the direction of the relationship between the latent variables (i.e. the direction of the single-headed arrows) and their connectedness in the model. Recursive and non-recursive models are the two categories of the structural model. It is essential to define the type of structural model being adopted as it allows the researcher to identify causality in the model and the alignment of variables to reduce the occurrence of model misspecification.

A recursive model has a unidirectional causal flow, with a lack of direct or indirect effect from the outcome construct on the predicting variables (Weston & Gore, 2006). It should be noted that there is an assumption that the disturbances in recursive models are uncorrelated and independent, with no feedback loop among the endogenous variables. Whereas, a non-recursive model which is the opposite of the recursive model is one that has a multidirectional casual flow, having at least one feedback loop (i.e. two-way causation). This type of model is especially useful when describing cause and effect reciprocal relationships (Weston & Gore, 2006). Unlike recursive models, the disturbances are assumed to be correlated in non-recursive models. Interestingly, Weston & Gore (2006), posits that some structural model can be partially recursive; however, the models are treated as either recursive or non-recursive. For example, if the error items have no direct effects among endogenous variables, the model is to be treated as a recursive model. Whereas, if there is a direct effect among the endogenous variable, then the model is thought to be non-recursive.

Measurement Model

A measurement model in SEM describes the part of the model concerned with examining the relationship between the latent variables and their measures (Arbuckle, 2016). This model shows the dependency of the observed variables known as indicators on the unobserved variables.

In addition to assessing the relationships between constructs, it crucial to address the interactions between constructs and their respective indicators, to avoid model misspecification, which may result in Type I or Type II errors, especially when testing hypothesis in SEM (Jarvis et al., 2003; Edwards & Bagozzi, 2000). Therefore, it is necessary to explicitly identify and specify how each construct and its indicators are connected in a model. In order to achieve clarity about the relationship in a measurement model, it is vital to have a clear conceptual definition of the construct and its empirical attributes, which should include the indicators.

There are two subcategories of measurement models – the reflective and formative models based on the direction of its causality (Howell et al., 2007). It has been argued that these models are both conceptually and psychometrically different from each other (Howell et al., 2007). Nonetheless, constructs that are formative in nature should be measured as such, without attempting to model it in a reflective format (Podsakoff et al., 2003).

In a reflective model, the direction of the causality is from the constructs to the indicators (*Figure 0:9*). Here, the constructs are exogenous variables and the indicators are endogenous variables, with the constructs expected to covary with other constructs in the model (Jarvis et al., 2003). It is also not unusual for the error terms, which are exogenous variables in reflective measures to inter-correlate since they are expected to have a common cause.
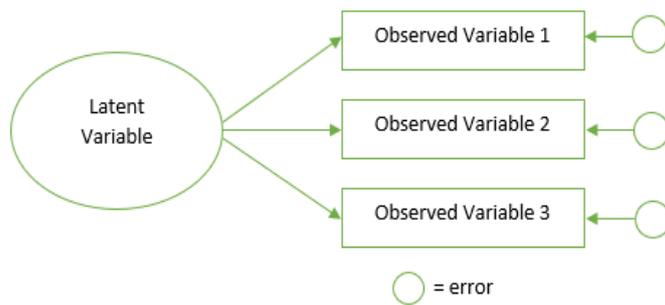
Figure 0:9: Reflective Measurement Model

To summarise a reflective model, while the latent constructs are not directly measured, it is assumed that the indicators are caused by the constructs. Also, there is an assumption that the indicators are not correctly measured and may be influenced by measurement errors, that are expected to be correlated.
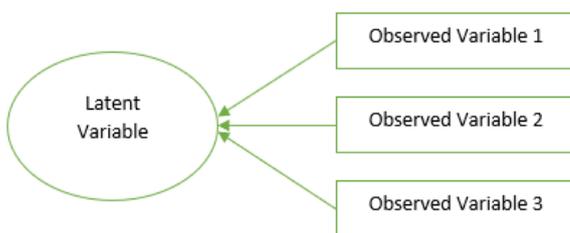
Figure 0:10: Formative model

The other type of measurement model is a formative measurement model. This model which is the opposite of a reflective model assumes that the indicators causally affects their constructs (*Figure 0:10*), which is the case when index variables are analysed (Petter et al., 2007). In the formative models, the causal effects move from the indicators to the constructs, and its error measurement is not accounted for as it is assumed the constructs are correctly measured (Petter et al., 2007). However, Kline (2015), argues that the assumption of a faultlessly measured construct may be wrong, especially considering the human error in measurement when processing the data. Hence, Edwards (2011), argues that it is difficult to ascertain the validity and reliability of the indicators in a formative measurement model. This study adopts the reflective measurement model to measure its latent variables.

Higher-Order Model and Nested Model

When the true meaning of a construct cannot be captured entirely by its indicators in a measurement model, a higher-order, also known as a second-order model may be used to represent the construct (Bryne, 2016). Since there are some complex constructs, particularly in social and business studies, the first-order model may not accurately measure the constructs, and other attributes would need to be introduced to help represent the construct. Put simply; a higher-order factor is an exogenous latent variable that is not directly linked with any indicators. Instead, it is indirectly related to the indicators by other lower-order factors. This study adopts a first-order model to measure its latent constructs.

Another vital model to review in SEM is the nested model. A model η_2 is said to be nested in another model η_1 if η_1, which is considered a full model contains all the terms in η_2 including a minimum of one additional term. Although the parameters are constrained in model η_2, the parameters are freely estimated in η_1 (Bentler and Satorra, 2010). Hence, the free parameters in η_1 are fixed in η_2, which results in a higher degree of freedom in η_2. In other words, two models, η_1 and η_2, are nested when $\eta_1 = \eta_2$ + parameter restrictions (constraints). A restricted model is said to be a special case of a full model since the restricted model has fewer free parameters as the non-restrictive model (Bryne, 2016). For instance, from the two models (equations 1 and 2) below, the second model is a restricted model of the first full model, including a,n additional term.

$$\eta_1 = \alpha_0 + \alpha_1\chi_1 + \alpha_2\chi_2 + \alpha_3\chi_1\chi_2 + \alpha_4\chi_1{}^2\chi_2 + \alpha_5\chi_2{}^2 + \varepsilon \qquad \textit{Equation 1}$$

$$\eta_2 = \alpha_0 + \alpha_1 \chi_1 + \alpha_2 \chi_2 + \alpha_3 \chi_1 \chi_2 + \varepsilon \qquad\qquad \textit{Equation 2}$$

The importance of a nested model is to allow researchers compare and examine model fitness of alternative models, through the use of the same set of data by comparing the Chi-Squared difference test or through the use of the modification indices (Bryne, 2016). In order to achieve this, the degrees of freedom are increased with more constraints in the restricted model with an influence on the Chi-Square value. While a researcher can increase the number of free parameters in a model to help reduce the degree of freedom by releasing some constraints in the restricted model, it is crucial to establish if the full model contributes any further information about the interactions between latent variables and their indicators, than the reduced model.

The Process of SEM Analysis
There are five necessary processes (Figure 0:11) involved in developing a model and conducting statistical analysis in SEM (Arbuckle, 2016). Each process would be discussed in this section.

| Model Specification | Model Identification | Model Estimation | Model Evaluation | Model Modification |
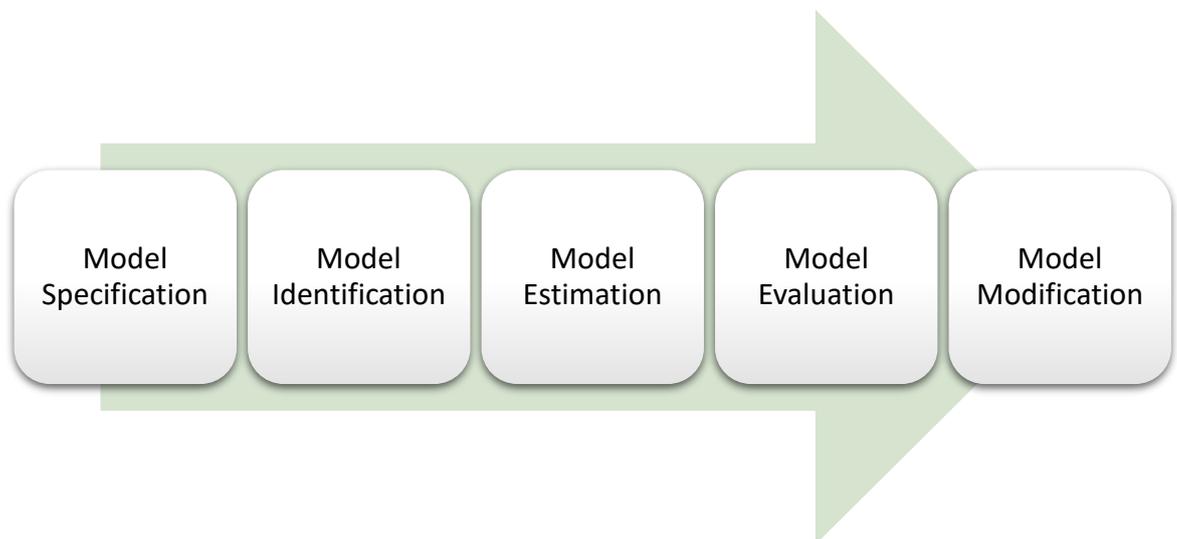
Figure 0:11: SEM Process

Model Specification
Model specification, which is the first process in SEM analysis, has been described as one of the building blocks of SEM (Bryne, 2016). This stage in the SEM analysis involves designing a conceptual model based on information obtained during the review of the literature (Kline,

2015). Here, the measured indicators, latent variables, exogenous and endogenous variables as well as the interactions between them are identified. The three stages involved in specifying a model, as identified by Ullman (2006) are

1. Develop the hypotheses (including the path diagram),
2. Identification of models using statistics, and
3. Estimating the statistical assumptions.

Hence, this phase of the SEM analysis serves to formally present the SEM model (translated from prior studies), identify the parameters, show the nature of the variables and indicate the relationships among the variables. Jarvis et al., (2003), adds that model specification determines the extent to which an implied conceptual model replicates the sample covariance matrix. Notably, a model is misspecified if the true model deviates from the conceptual model. To avoid bias, a researcher should identify and decide on the nature of the variable and its interactions with other variables in this phase of the analysis. In SEM analysis, a model that best fits the data can be selected beforehand from a distribution based on the maximum likelihood principle. In order to detect issues relating to misspecification using the AMOS software, standardised residuals and modification indices are examined.

Model Identification
Model identification is one of the critical processes of SEM analysis. In order to conduct an SEM analysis, the conceptual model must be identified, which implies that the vector of the unknown parameters should be expressed uniquely as it relates to the elements of the variance-covariance matrix; meaning that the hypothesised model can explain variance-covariance matrix.

Principally, identification in SEM is primarily concerned with the number of known and unknown in the structural equation. Hence, a model can be described as identified if the known parameter suggests that there is the best value for each unknown parameter. Similarly, an equation is unidentified if there are more unknown parameters than known. A model can also be just-identified, where the number of known and unknown parameters are equal; and over-identified when there are more known parameters than unknown. Bryne (2010), suggests that an over-identified model is the most ideal for an SEM analysis.

In SEM model identification, the known parameters consist of the variance and covariance of the measured variables and the unknown parameters consists of the interactions in the

hypothesised model, for estimation. In SEM, relationships are estimated from available information provided in the variance-covariance matrix, which is obtained from the measurement indicators. Here, using multiple indicators is like a factor analysis, where the indicators are utilised to estimate the factor loadings to a variable of interest, where the subset of the components is used to summarise the interactions.

According to Davis (1993), even though a just-identified model can be used to obtain the estimates of parameters, it produces insignificant model fit, which does not provide any additional information about the strength or goodness of the model, which makes the model statistically meaningless. Whereas, over-identified models fit less well theoretically. Therefore, an over-identified model having a good fit implies that the model reasonably represents the constructs under review.

Consequently, fixing or constraining model parameters is an essential phase in SEM analysis, to allow the creation of identifiable models, and comparable nested models (Smith et al., 2009). For a model to be identified, a regression weight for each error term of the indicator variables should be assigned a fixed loading of a non-zero value, which is usually 1 and results in the same estimate as linear regression. The indicator that has been assigned the fixed loading is known as the marker variable. A researcher can also impose additional constraints on the model, either by removing unknown parameters or adding more known parameters. It should be noted, however, that these additional constraints should be based on theories. There are tests that can be used to add or remove parameters in SEM model identification; for instance, the Wald theory test can be adopted as a multivariate test for removing parameters while the Lagrange Multiplier theory provides information for adding parameters.

Model Estimation

The next phase after specifying and identifying a model is estimating the parameters of the model using the data which has been gathered, by imposing proportionality constraints to assess if the hypothesised model is consistent with the collected data (Bollen and Davis, 2009). In other words, model estimation in SEM assesses the extent to which the model represents the data reflecting the theory.

There are several methods of model estimation in SEM such as Maximum Likelihood (ML), Generalised Least Squares, Weighted and Unweighted Least Squared, Bayesian Estimation, Browne's Asymptotic Distribution Free (ADF) criterion etc. (Arbuckle, 2016). The estimation

methods in SEM are underpinned by various assumptions, which includes multivariate distribution of the indicator variables in relation to skewness and kurtosis coefficients (Ullman & Bentler, 2003).

The most popular estimation method in SEM analysis is the Maximum Likelihood. According to Byrne (2010), ML estimates population parameters by maximising the likelihood of a sample, based on the joint probability of continuous sample observations. The ML approach adopts a full information iterative process to estimate all equations the model to produce the best estimates. Maximum Likelihood is asymptotically unbiased with large samples provided certain assumptions such as data normality, no missing values, independency of exogenous variables and error terms are met. During model estimation, several statistics are generated, these indices and their acceptable values would be discussed further.

Model Evaluation: Model Fit and Fit Indices
The aim of model evaluation in SEM is to ascertain the degree to which the hypothesised model is consistent the data that has been gathered, based on the estimated parameters using the methods discussed earlier in (Section 0). Model evaluation can be achieved by assessing the model (a global model fit) and the individual parameters in the model.

In model evaluation, there are different fit indices to estimate the fitness of a model, comparing nested models, or searching for parsimonious models. Even though there seems to be a lack of consensus regarding the most suitable cut-off, the model fit indices would be discussed Table 0:5 with justification for an acceptable cut-off point which would be adopted in this study. Even though there are several fit indices, there is no general fit index, since the available indices are used based on various justification; hence, the cut-off points for the index may vary across various studies, depending on the distribution, estimators, or sample sizes.

It should be noted that fit indices are in two various categories; absolute and incremental (also known as a relative) fit indices. Absolute fit indices assume that a good model has a model fit of zero, whereas, the incremental fit indices has a fit of 1. These indices would be discussed further.

Absolute fit indices show how well a model fits the sample data and indicates the relationships that exist between the data gathered and the theory proposed (McDonald and Ho, 2002). The absolute fit indices are useful to establish the extent to which the hypothesised model replicates the data collected. The indices assume that the best model has a zero-fit index (Kenny and

McCoach, 2003). The primary aim of the absolute fit indices to assess a model's goodness of fit and estimation of the hypothesised parameters. The measures used to assess this fit include but are not limited to Chi-Square test, RMSEA, RMR, SRMR, GFI and AGFI (Table 0:5). Hu and Bentler, (1999), points that while the measures have been adopted to establish a model's fitness, they are merely abstractions of realities, designed to address issues relating to model misspecifications and sample size. In summary, the indices attempt to create a balance between model simplicity and goodness of fit (Arbuckle, 2016).

The incremental fit indices which is also known as the comparative or relative fit indices, unlike the absolute fit indices, are group of indices that do not use the Chi-Square in its raw form, but rather the Chi-Square value to a baseline model (Miles and Shevlin, 2007; Kenny and McCoach, 2003; McDonald and Ho, 2002). The null hypothesis for these models is that all its observed variables are uncorrelated (McDonald and Ho, 2002). The three most common incremental fit indices are the Comparative Fit Index (CFI), Normed Fit Index (NFI) and the Relative Non-Centrality Index (RNI) (Table 0:5 for description).

Indices	Description	Cut-Off for Good Fit
CMIN/DF	This is the minimum discrepancy $\hat{C}$ divided by its degree of freedom ($\frac{\hat{c}}{d}$). This ratio is commonly used as an alternative to the absolute chi-square when the sample size is larger.	The ratio is expected to be close to 1 (Wheaton et al., 1977). Byrne (2010) adds that an acceptable fit should be <2
Chi-Square (X^2)	It assesses the overall fit and the discrepancy between the sample and the fitted covariance matrices. It is important to note that the Chi-Square is highly sensitive to sample size, which may result in Type I error in a large sample or Type II error in a small sample. The Chi-Square, as well as other absolute fit indices, do not use an alternative model as a base for comparison. The null hypothesis is rejected if the T statistics exceeds an alpha level of significance.	p-value ≥ 0.05
Normed Fit Index (NFI)	Represents the proportion of which a model fit improves in relation to a null model	NFI close to 1 (≥ 0.90) indicates a good fit.

Non-Normed Fit Index or Tucker and Lewis Index (NNFI, TLI)	NNFI, which is also known as TLI, is most preferable for smaller samples. It is a baseline comparison index that utilises the Tucker-Lewis coefficient P_2. The closer the index is to 1, the more indicative of a model's fit.	≥ 0.95
Comparative Fit Index (CFI)	The CFI compares the fit of the baseline model (independence model) with the theoretical model. The indicator is based on the relative non-centrality between a conceptual model and the null model where the error variances are estimated. Values close to 1 indicate a good fit. This index is thought to be a revised form of NFI not sensitive to sample size.	$CFI \geq 0.95$
Root Mean Square Error of Approximation (RMSEA)	The RMSEA is a practical fit index which produces an average amount of misspecification for a model per degree of freedom and compensates for the influence of the model complexity. Hence, it favours models with many parameters. Basically, the RMSEA helps avoid issues relating to the sample size by analysing the discrepancy between the hypothesised model with optimally chosen parameter estimates, and the population covariance matrix. Generally, an RMSEA ≤ 0.05 indicates a good fit, although, it has been suggested that combined values of $CFI \geq 0.95$ and RMSEA ≤ 0.06 should be used to determine the approximate model fit. Nonetheless, it has been argued that the RMSEA should be ≤ 0.08 for a satisfactory fit.	≤ 0.06 represents a close fit, while 0.0 indicates an exact fit.
Root Mean Square Residual (RMR)	The RMR, which is a variation of the chi-square statistics, is also an absolute fit index. It is the square root of the discrepancy between the sample covariance and the model covariance matrix.	≤ 0.08
Standardised Root Mean Square Residual (SRMR)	Similar to RMR, it is the square root of the average squared residual by which the sample variance and covariance are different from their estimates obtained on the assumption that the model is correct.	≤ 0.08
Hoelter's Critical N (CN)	This is vital for the sample size. It described the largest sample size for which to accept the	AMOS reports a critical N for

	hypothesised model as correct. A model is considered a good fit if the CN ≥ 200.	significance levels of 0.05 and 0.01.
Goodness of Fit Index (GFI)	The GFI is also an alternative to the Chi-Square tests. It estimates the variance in reference to the estimated population covariance. The variance-covariance matrix shows how the model replicates the observed covariance matrix. Essentially, the GFI is a measure of fit between the hypothesized model and the observed covariance matrix. GFI is sensitive to parameters such as sample size.	GFI has a minimum value of 0 and a maximum of 1. An acceptable GFI is expected to be around 0.85.
Adjusted Goodness of Fit Index (AGFI)	This is an adjusted GFI value in terms of degrees of freedom and increases with sample size.	A good model fit should be ≥ 0.90

Table 0:5: Model Fit Indices and Acceptable Cut-off Points

The Chi-Square test is appropriate to establish that the variance-covariance matrix of the null hypothesis, reproduces the observed variance-covariance matrix (Bagoszzi and Yi, 2012). This method was utilised to either accept or reject hypotheses based on the observable differences between the sample and reproduced covariance matrices of the specified model. However, since this approach is highly sensitive to sample size, (i.e. the larger the sample size, the higher the Chi-Square value), the CMIN/DF, which is the ratio of minimum discrepancy to the degree of freedom is a better alternative in empirical studies, despite it being unable to represent an acceptable model fit (Kenny and McCoach, 2003).

Although it has been argued that a model's goodness of fit is attained when the Chi-Square is non-significant (i.e. p-value ≥ 0.05), studies have questioned its suitability to establish the fitness of the model in relation to the data collected (Marsh et al., 2004). However, due to the sensitivity of the chi-square to sample sizes, it becomes increasingly difficult to obtain a satisfactory model as the sample size becomes larger. As a large sample size can result in a high chi-square value, which may cause a Type I error, while a small sample size can result in a Type II error (McDonald & Ho, 2002). While there is no consensus regarding the suitable sample size in SEM, a sample size above 100 is recommended (Bagozzi and Yi 2012).

Model Modification

The final process in SEM is a model modification or improvement. The modification is carried out to enhance a models' goodness of fit, in a theoretically justifiable manner, consistent with the aim of the study. The model modification indices describe the extent to which an SEM model is a misfit and can be conceptualised by the chi-square with one degree of freedom (Bryne, 2016). This allows some of the initial assumptions of the model to be relaxed, to achieve a model with a better fit, without creating additional issues with model identification (Arbuckle, 2016).

Appendix 3

CONSENT TO PARTICIPATE IN INTERVIEW

<u>Coopetition as an Emerging Organisational Strategy For Supply Chain Resilience – An Exploratory Study Of The UKCS Oil And Gas Sector</u>

You have been asked to participate in a research study conducted by Eunice Y Oke from Aberdeen Business School at The Robert Gordon University. The purpose of the study is to investigate the UK Oil and Gas Industry holistically for evidence of coopetition and how the strategy can be adopted to improve performance within the industry. The study aims to develop an industry guideline to support organisations interested in adopting this inter-organisational strategy.

You were selected as a possible participant in this study because you have ample knowledge of strategy and management concepts that are vital for the proper understanding of this study. You should read the information below, and ask questions about anything you do not understand, before deciding whether or not to participate.

- This interview is voluntary. You have the right not to answer any question, and to stop the interview at any time or for any reason.

- You will not be compensated for this interview.

- Unless you give us permission to use your name, title, and / or quote you in any publications that may result from this research, the information you provide us will be treated confidentially.

- I would like to record this interview so that I can use it for reference while proceeding with this study. I will not record this interview without your permission. If you do grant permission for this conversation to be recorded, you have the right to revoke recording permission and/or end the interview at any time.

- The data gathered would be securely stored with only authorised access to the research team using the approved RGU policy.
- The data would not be used for any other purpose except as stated above, using RGU approved policy.

I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

(*Please check all that apply*)

☐ I give permission for this interview to be recorded.

❖ I give permission for the following information to be included in publications resulting from this study:

☐ my name   ☐ my title   ☐ direct quotes from this interview

Name of Participant:

Signature of Participant _____   Date _____

Signature of Investigator _____   Date _____

Please contact Eunice Y Oke, y.o.e.oke@rgu.ac.uk with any questions or concerns.

Appendix 4:

<div align="right">9/03/2015</div>

Dear Sir/Madam

CONCEPT CLARIFICATION INTERVIEW

This study focuses on investigating the coopetition concept and how it can be conceptualised and positioned within the UK Oil and Gas Industry. As this term is emerging in management literature, your assistance is needed to conceptualise this study accurately. Please note that the interview may take about 30 minutes. I would appreciate your expert contribution.

Yours sincerely
Eunice Yewande Oke

Coopetition as an Emerging Organisational Strategy For Supply Chain Resilience – An Exploratory Study Of The UKCS Oil And Gas Sector

Interview Schedule

Section 1: About the interview

- Coopetition is an emerging management concept that simultaneously combines the two traditional business strategies – competition and collaboration. Before this, inter-firm relationships involved organisations either engaging in competitive relationships with similar organisations or collaborating on some of its functions with other organisations. This research would, therefore, seek to understand further this growing paradigm and how it can be applied successfully in industries. The aim of the study is to develop an industry model for successfully developing and implementing beneficial coopetition in the oil and gas sector. The need for this review is as a result of the downward fortune of the oil and gas industry. Organisations are continuously seeking avenues to optimise their productivity. In fact, Wood (2014) in the Wood Review suggested that oil and gas organisations should be encouraged to collaborate with each other. However, in a highly competitive industry such as the oil and gas industry, pure collaboration can be difficult. Hence, coopetition may be ideal to maximise productivity. Also, the emerging nature of coopetition makes it difficult for organisations to separate collaboration from coopetition. Hence, this study would attempt to investigate the extent to which coopetition is currently being practised informally in industries and provide an opportunity with the industry model to formalise these relationships.

- The purpose of this interview is to clarify some of the concepts to improve the understanding and accuracy of this study.

- The interview is face to face.

- The duration of the interview is around 30 minutes.

Section 2: Preamble

- Are you happy to take part in the interview today? You are free to withdraw from the interview at any point if you wish to.

- Do you have any questions before we start?

- Just to help me with my notes is it OK to record our conversation?

Section 3: Introduction to Participant

- What is your job role?

- How long have you held this position?

- What industry do you currently work?

Section 4: Conceptualising coopetition

This section would aim to conceptualise coopetition and understand the extent to which it is currently being practised in industries.

1. What do you understand by the term competition?
2. What do you understand by the term collaboration?
3. Is there a difference between cooperation and collaboration?
    - Can collaboration and cooperation be used interchangeably?
4. Have you heard the term coopetition?
    - When is it ideal to engage in a coopetitive relationship?

Section 5: Coopetition in Supply Chain

The aim of this section is to explore the extent to which the concept of coopetition is understood and applied in the supply chain perspective?

5. To what extent can coopetition exist in a supply chain?
    - To what extent is coopetition currently applied formally in supply chain?
    - Do you think there are informal coopetition practices within supply chains?
6. What form of functions in a supply chain should coopetition occur or not occur?
7. What is the level of coopetition practices *within* and *between* supply chain networks?

Section 6: Components of Coopetition

This section would attempt to explore the various components involved in ensuring a successful coopetitive relationship.

8. Are there any differences between knowledge sharing and knowledge transfer?

9. Do you think transparency and openness are vital to a successful coopetitive relationship?

   - To what can an organisation protect its competitive advantage and also be transparent in a coopetitive endeavour?

10. What is your opinion about the concept of trust especially in relation to inter-organisational relationships?

11. How can trust be separated from commitment?

Appendix 5:

Dear Sir/Madam

INTERVIEW QUESTIONS

This study focuses on investigating the coopetition concept and how it can be conceptualised and positioned within the UK Oil and Gas Industry. Please note that the interview may take about 30 minutes. I would appreciate your expert contribution.

Yours sincerely
Eunice Yewande Oke

Coopetition as an Emerging Organisational Strategy For Supply Chain Resilience – An Exploratory Study Of The UKCS Oil And Gas Sector

Interview Schedule

Section 1: About the interview

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- The purpose of this interview is to obtain some insights about how inter-organisational relationships function within the industry.
- The interview is face to face.
- The duration of the interview is around 1 hour.

Section 2: Preamble

- Are you happy to take part in the interview today? You are free to withdraw from the interview at any point if you wish to.
- Do you have any questions before we start?
- Just to help me with my notes is it OK to record our conversation?

- What is your job role?

- How long have you held this position?

- What industry do you currently work?

- Have you been involved in any interactions with other companies in the industry?

Section 4: Conceptualising coopetition

This section would aim to conceptualise coopetition and understand the extent to which it is currently being practised in industries.

12. What form of interactions have you had with other companies in your industry?
13. What is your relationship with your competitors?
14. What form of relationship have you had with your competitors?
15. Do you think it is possible to collaborate with your competitors?
16. Have you heard the term coopetition?
17. Do you think coopetition can exist successfully in your industry?
18. Would you consider adopting this strategy?
19. What factors would make you consider adopting this strategy?
20. What effects do you think this strategy has on the OGI supply chain?
21. How can supply chain affect this strategy in your opinion?

Section 5: Managing Coopetition

The aim of this section is to explore the participants' opinion on managing this strategy.

22. If you had to manage this strategy, how would you approach it?
23. Do you foresee any issues regarding the management of this strategy?
24. How would you ensure you obtain all the benefits from this alliance?
25. Literature suggests either integrating or separating the elements of the alliance; what are your thoughts?
26. What role do you think trust plays in this alliance?

<u>Section 6: The Joint Industry Projects Framework</u>

This section is related to those in the oil and gas industry. It aims to understand the concept of JIP and how it functions, thereby uncovering how JIP relates to the coopetition concept. This would reveal if the JIP is an industry level of coopetition.

1. Do you have any knowledge about the oil and gas industry 'Joint Industry Projects'?
2. Can you explain the JIP concept and how it benefits the oil and gas industry?

Appendix 6

The questionnaire can be viewed https://forms.gle/3j6ikk2tQtNQPsdz6

Coopetition Questionnaire

This section is interested in your work and the length of work experience.

To what extent are you involved in Inter-Organisational Relationships at your organisation

○ Not at all involved

○ Small extent

○ Moderate

○ Some extent

○ Large extent

How long have you been employed in the Oil and Gas Industry

○ Not employed in the industry

○ 1-5

○ 6-9

○ 10-15

○ 16-19

○ 20+

I am familiar with the term coopetition

O Strongly disagree

O Disagree

O Neutral

O Agree

O Strongly agree

How often do you work with competitors on a project?

O Never

O Almost Never

O Sometimes

O Almost Always

O Always

How likely is it for competitors to collaborate in your industry

○ Very Unlikely

○ Unlikely

○ Not Sure

○ Likely

○ Very Likely

Coopetition can occur unintentionally in my industry

○ Strongly Disagree

○ Disagree

○ Neutral

○ Agree

○ Strongly Agree

BACK   NEXT

To what extent do you agree with each of the following statements? Please click on a circle to indicate your choice for each statement. *

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Our collaboration is regulated through a comprehensive clearly worded contract.	○	○	○	○	○
The contract with our partners describes in detail every aspect that we think is of interest.	○	○	○	○	○
We and our partners fix all the collaboration related details in a contract	○	○	○	○	○
We are hesitant to transact with our partners when the specifications are vague	○	○	○	○	○
A contract is a necessary condition for coopetition	○	○	○	○	○
Contracts are more important than trust in a collaborative relationship.	○	○	○	○	○
We rely on contracts for all alliances outside our organisation	○	○	○	○	○

By clicking one circle per row, please select the extent of your agreement with each of the following statements. *

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Our partners keep promises made to our firm.	○	○	○	○	○
Our partners are always trustworthy	○	○	○	○	○
Our partners have always been even-handed in our collaborations.	○	○	○	○	○
Our partners do not require close supervision	○	○	○	○	○
Our partners are truthful	○	○	○	○	○
Competitors cannot be trusted	○	○	○	○	○
Trust is necessary in coopetition.	○	○	○	○	○

To what extent do you agree with each of the following statements? *

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
We have a dedicated organisational unit managing inter-organisational activities	O	O	O	O	O
We permanently use dedicated alliance managers	O	O	O	O	O
We regularly carry out standardised assessments of our alliances	O	O	O	O	O
An independent resource management team is vital when competitors collaborate.	O	O	O	O	O
We use a dedicated alliance team to monitor communication in interactions outside our organisation	O	O	O	O	O
Our alliance team determines the form of inter-organisational relationships to adopt.	O	O	O	O	O
Our alliance team are proactive	O	O	O	O	O

Please select the extent of your agreement with each of the following statements. *

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Our alliances are monitored regularly	○	○	○	○	○
The industry regulates alliances outside our organisation	○	○	○	○	○
The pre-competitive phase should be managed separately from the competitive phase.	○	○	○	○	○
A separate team manages the competitive phase of the relationship.	○	○	○	○	○
A different team manages the collaborative phase of the alliance.	○	○	○	○	○

Please click on a circle for each statement to indicate how much you agree with each of the following statements *

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
We are in close competition with our alliance partners	○	○	○	○	○
We are collaborating with competitors to achieve a common goal	○	○	○	○	○
We find it important to have active competition with our collaborators	○	○	○	○	○
We are deliberate about all our inter-organisational relationship	○	○	○	○	○
We are familiar with coopetition	○	○	○	○	○

By clicking one circle per row, please select the extent of your agreement with each of the following statements. *

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
We have engaged in unplanned collaboration in the past	O	O	O	O	O
Competitors often collaborate in my industry.	O	O	O	O	O
I have had to work closely with a competitor in the past	O	O	O	O	O
Our industry encourages collaboration	O	O	O	O	O
Collaboration should only occur between indirect competitors.	O	O	O	O	O
Collaboration is more profitable between direct competitors.	O	O	O	O	O
Our supply chain is reactive	O	O	O	O	O

Please select the extent to which you agree with each of the following statements by clicking one circle per row. *

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
We have multiple suppliers for each item in our production.	O	O	O	O	O
Collaboration helps us respond quicker to crisis	O	O	O	O	O
We have collaborative relationships with our supply chain partners	O	O	O	O	O
You can encourage collaboration between your suppliers.	O	O	O	O	O

What is your management level? *

○ Non-Management

○ Low level

○ Middle level

○ Top-level

○ Owner/CEO

What is your educational background? *

○ Primary

○ Secondary

○ College

○ Under graduate

○ Post graduate

What is your employment type? *

○ Volunteer

○ Self-Employed

○ Employed (Full Time)

○ Employed (Part-Time)

○ Student

What is the size of your organisation? *

○ Micro (< 10)

○ Small (10 – 49)

○ Medium (50-249)

○ Large (> 250)

○ Multi-National (more than 1 country)

Appendix 7:

Statistics

		All.Fun_1	All.Fun_2	All.Fun_3	All.Fun_4	All.Fun_5	All.Fun_6
N	Valid	380	380	380	380	380	380
	Missing	0	0	0	0	0	0
Mean		2.73	2.86	2.72	3.09	2.99	3.02
Std. Deviation		.831	.894	.885	.914	.946	.954
Skewness		.299	.110	.307	-.282	-.078	-.102
Std. Error of Skewness		.125	.125	.125	.125	.125	.125
Kurtosis		-.384	-.802	-.465	-.686	-.886	-.928
Std. Error of Kurtosis		.250	.250	.250	.250	.250	.250
Range		4	4	4	4	4	4
Minimum		1	1	1	1	1	1
Maximum		5	5	5	5	5	5

Statistics

		All.Fun_7	Contract_1	Contract_2	Contract_3	Contract_4
N	Valid	380	380	380	380	380
	Missing	0	0	0	0	0
Mean		2.88	3.46	3.49	3.54	3.72
Std. Deviation		.897	.928	.932	.911	.832
Skewness		.070	-.402	-.451	-.623	-.986
Std. Error of Skewness		.125	.125	.125	.125	.125
Kurtosis		-.625	-.228	-.196	.244	1.271
Std. Error of Kurtosis		.250	.250	.250	.250	.250
Range		4	4	4	4	4
Minimum		1	1	1	1	1
Maximum		5	5	5	5	5

Statistics

		Contract_5	Contract_6	Contract_7	ICP_1	ICP_2	ICP_3
N	Valid	380	380	380	380	380	380
	Missing	0	0	0	0	0	0
Mean		3.37	3.642	3.72	4.00	3.86	4.105
Std. Deviation		.954	.8554	.861	.644	.687	.5941
Skewness		-.288	-.665	-.770	-.833	-.687	-.717
Std. Error of Skewness		.125	.125	.125	.125	.125	.125
Kurtosis		-.442	.351	.677	2.039	.960	2.589
Std. Error of Kurtosis		.250	.250	.250	.250	.250	.250
Range		4	4.0	4	3	3	3.0

Minimum	1	1.0	1	2	2	2.0
Maximum	5	5.0	5	5	5	5.0

Statistics

		ICP_4	ICP_5	Man.Ten_1	Man.Ten_2	Man.Ten_3	Man.Ten_4
N	Valid	380	380	380	380	380	380
	Missing	0	0	0	0	0	0
Mean		3.92	3.70	2.39	2.35	2.20	2.24
Std. Deviation		.707	.795	.937	.976	.822	.911
Skewness		-.876	-.589	.848	.719	.823	.719
Std. Error of Skewness		.125	.125	.125	.125	.125	.125
Kurtosis		1.901	.513	.231	-.059	.651	.058
Std. Error of Kurtosis		.250	.250	.250	.250	.250	.250
Range		4	4	4	4	4	4
Minimum		1	1	1	1	1	1
Maximum		5	5	5	5	5	5

Statistics

		Man.Ten_5	SCF_1	SCF_2	SCF_3	SCF_4	Trust_1
N	Valid	380	380	380	380	380	380
	Missing	0	0	0	0	0	0
Mean		2.24	2.65	3.24	2.53	2.67	4.03
Std. Deviation		.852	.970	.965	.994	1.031	.709
Skewness		.806	.285	-.419	.445	.312	-.710
Std. Error of Skewness		.125	.125	.125	.125	.125	.125
Kurtosis		.499	-.790	-.708	-.433	-.870	1.012
Std. Error of Kurtosis		.250	.250	.250	.250	.250	.250
Range		4	4	4	4	4	3
Minimum		1	1	1	1	1	2
Maximum		5	5	5	5	5	5

Statistics

		Trust_2	Trust_3	Trust_4	Trust_5	Trust_6	Trust_7
N	Valid	380	380	380	380	380	380
	Missing	0	0	0	0	0	0
Mean		3.984	3.987	3.98	4.047	4.07	4.09
Std. Deviation		.7004	.7098	.691	.7027	.699	.689
Skewness		-.720	-.604	-.603	-.571	-.891	-.365
Std. Error of Skewness		.125	.125	.125	.125	.125	.125
Kurtosis		1.386	.974	1.156	.886	2.214	-.041
Std. Error of Kurtosis		.250	.250	.250	.250	.250	.250
Range		4.0	4.0	4	4.0	4	3

Minimum	1.0	1.0	1	1.0	1	2
Maximum	5.0	5.0	5	5.0	5	5

Statistics

		UCP_2	UCP_3	UCP_4	UCP_5	UCP_7	Mangement_Level
N	Valid	380	380	380	380	380	380
	Missing	0	0	0	0	0	0
Mean		3.88	3.88	3.75	3.75	3.82	3.16
Std. Deviation		.726	.740	.763	.717	.741	.940
Skewness		-.898	-.632	-.731	-.675	-.524	-.268
Std. Error of Skewness		.125	.125	.125	.125	.125	.125
Kurtosis		1.910	.991	.993	1.041	.740	.262
Std. Error of Kurtosis		.250	.250	.250	.250	.250	.250
Range		4	4	4	4	4	4
Minimum		1	1	1	1	1	1
Maximum		5	5	5	5	5	5

Appendix 8
All.Fun_1

Normal Q-Q Plot of We have a dedicated organisational unit managing inter-organisational activities
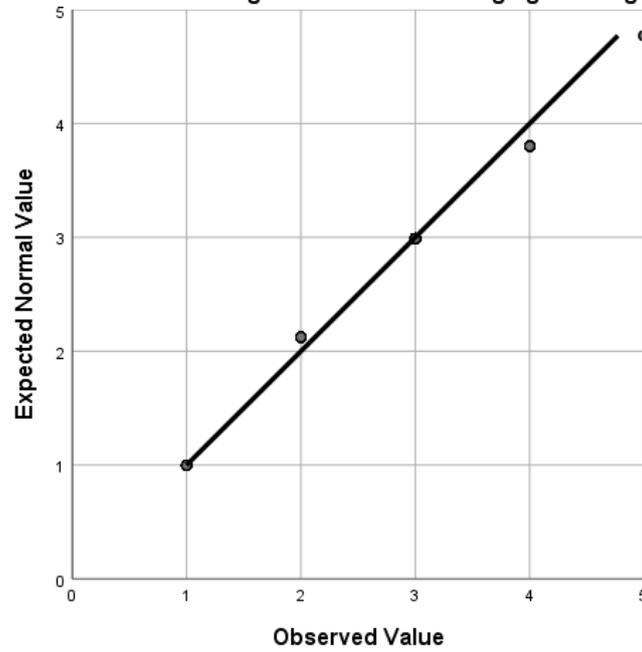
Detrended Normal Q-Q Plot of We have a dedicated organisational unit managing inter-organisational activities
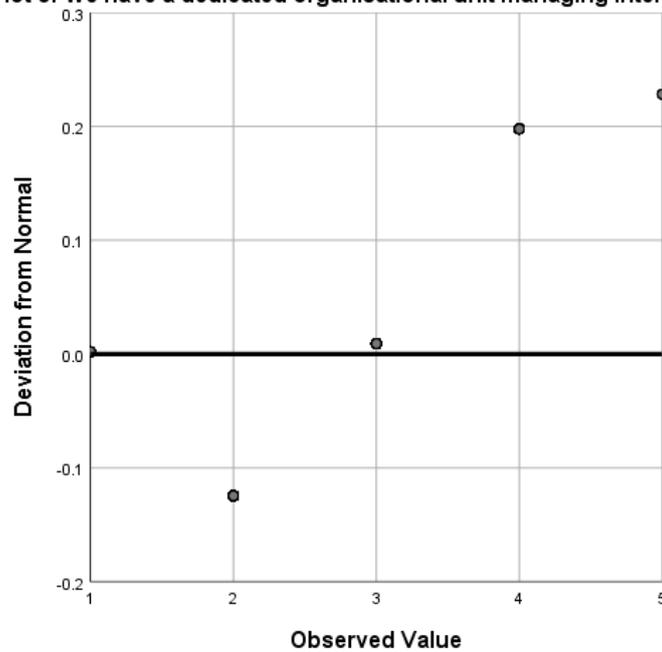
All.Fun_2

Normal Q-Q Plot of We permanently use dedicated alliance managers
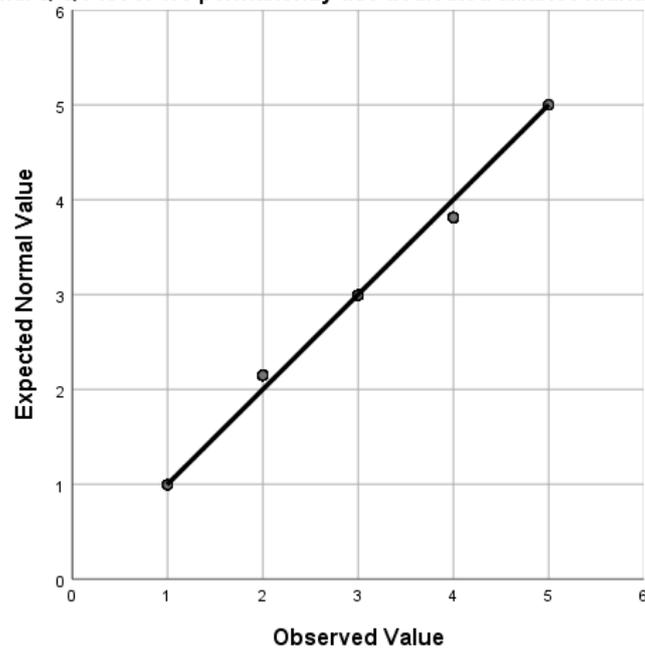
Detrended Normal Q-Q Plot of We permanently use dedicated alliance managers
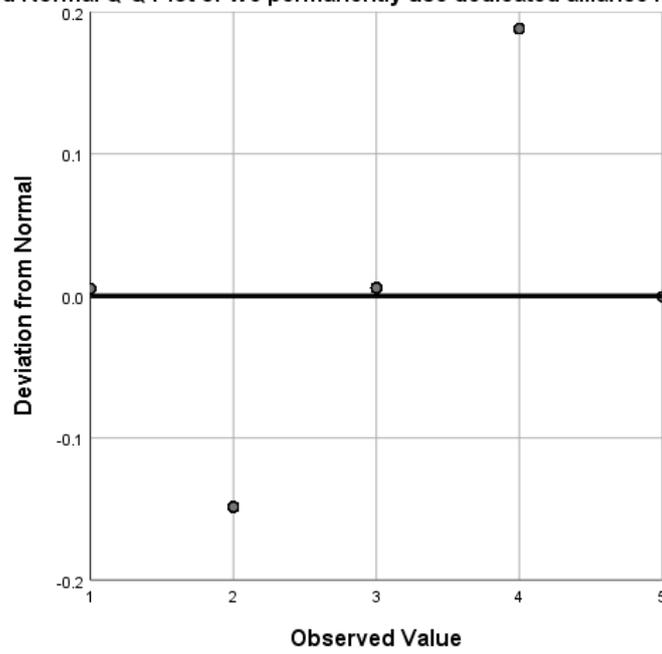
All.Fun_3

Normal Q-Q Plot of We regularly carry out standardised assessment of our alliances
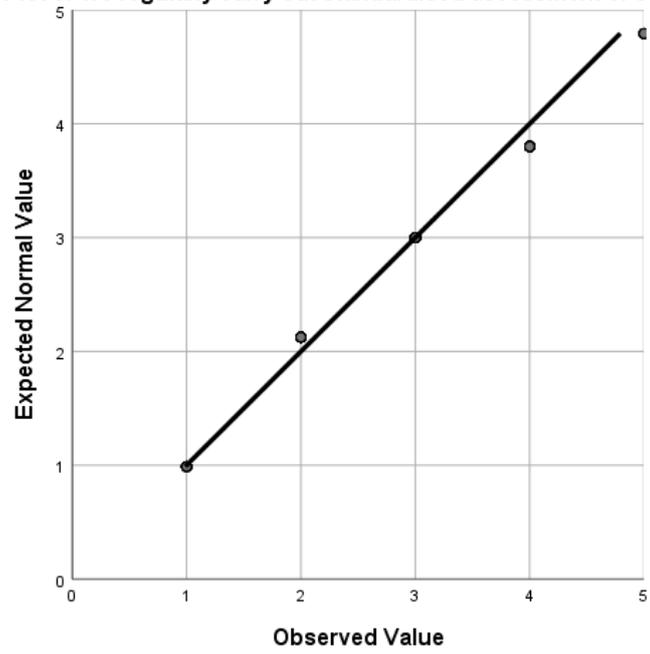
Detrended Normal Q-Q Plot of We regularly carry out standardised assessment of our alliances
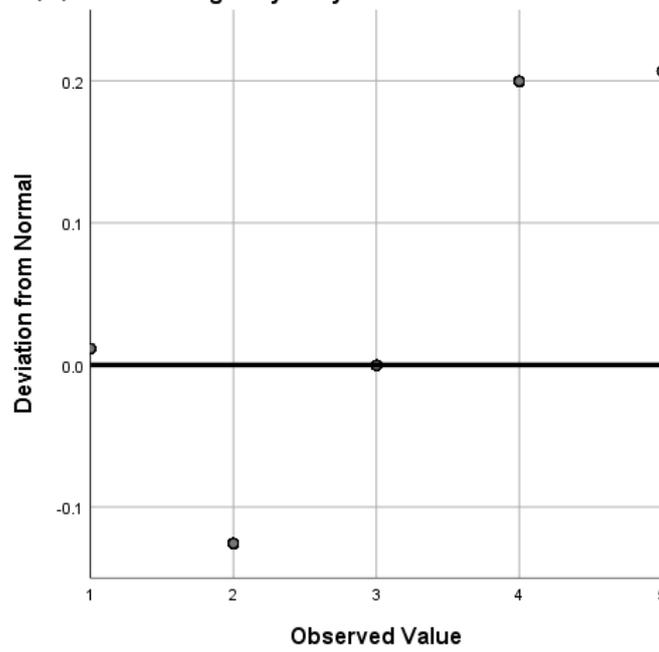
All.Fun_4

Normal Q-Q Plot of An independent resource management team is vital when competitors collaborate
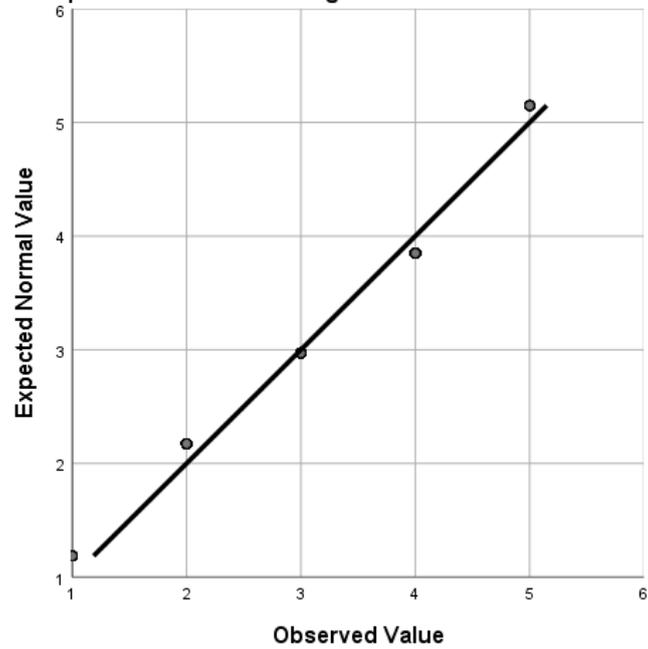
Detrended Normal Q-Q Plot of An independent resource management team is vital when competitors collaborate
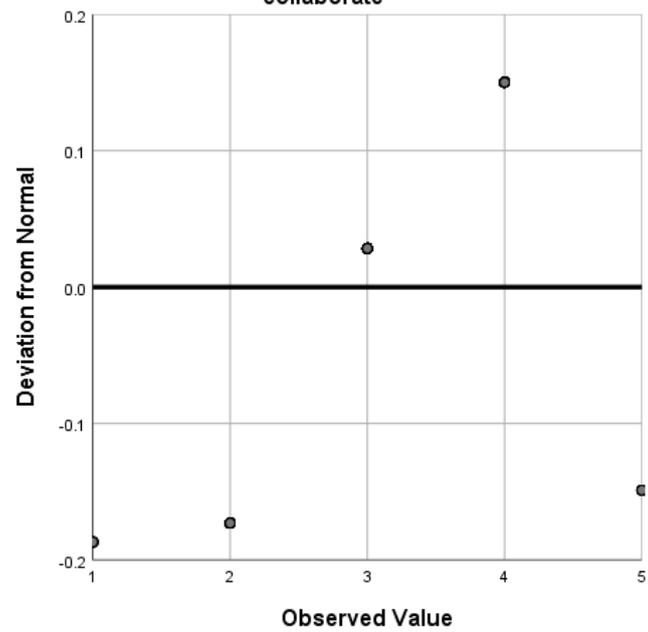
All.Fun_5

Normal Q-Q Plot of We use a dedicated alliance team to monitor communication in interactions outside our organisation
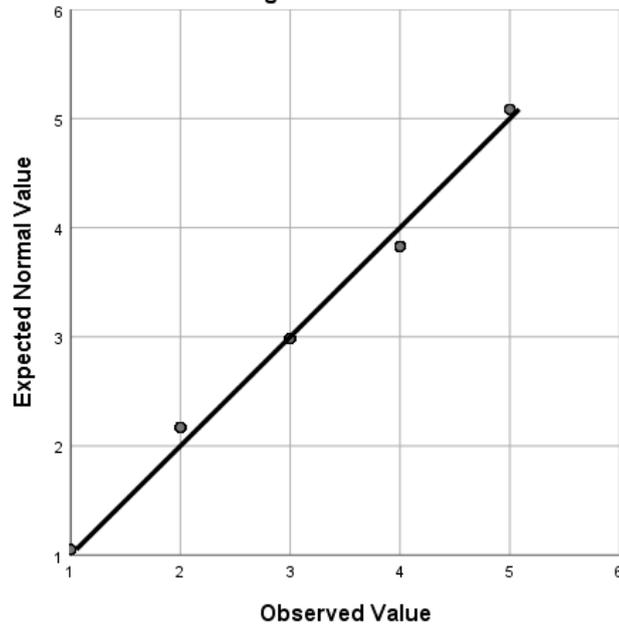
Detrended Normal Q-Q Plot of We use a dedicated alliance team to monitor communication in interactions outside our organisation
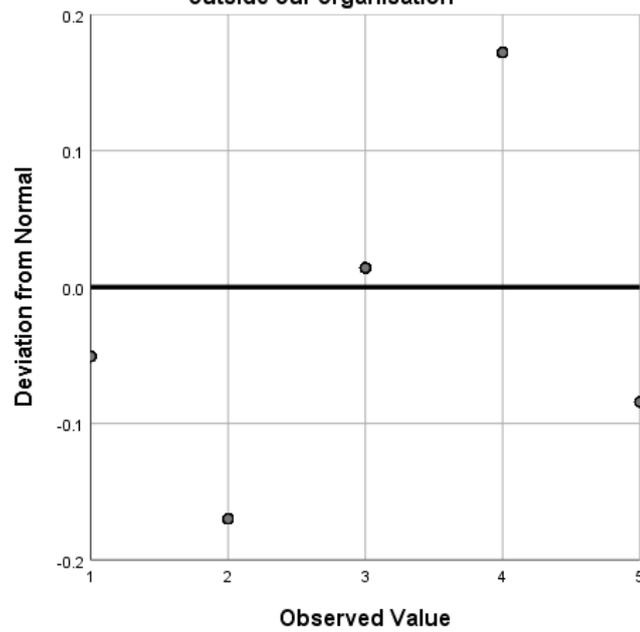
All.Fun_6

Normal Q-Q Plot of Our alliance team determines the form of inter-organisational relationships to adopt

Detrended Normal Q-Q Plot of Our alliance team determines the form of inter-organisational relationships to adopt

All.Fun_7
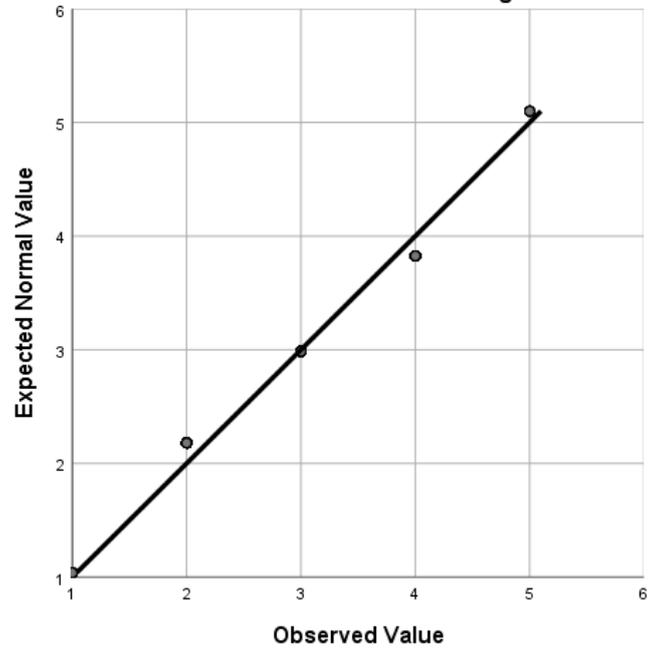
Normal Q-Q Plot of Our alliance team are proactive

Detrended Normal Q-Q Plot of Our alliance team are proactive
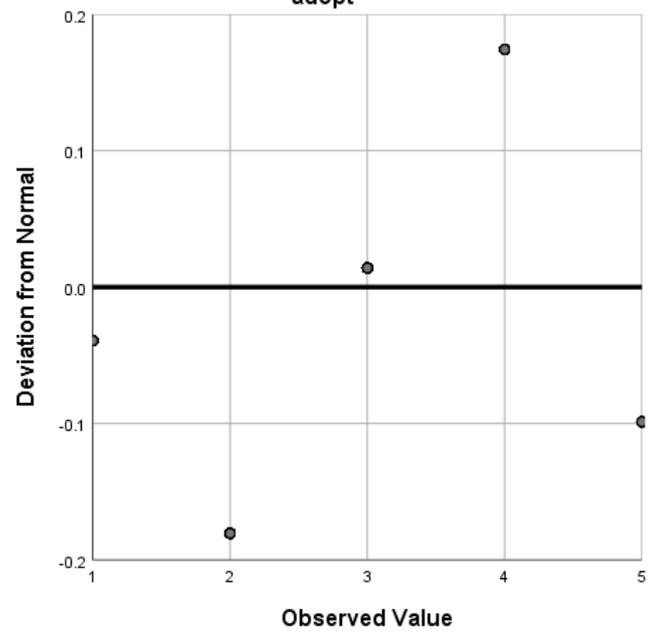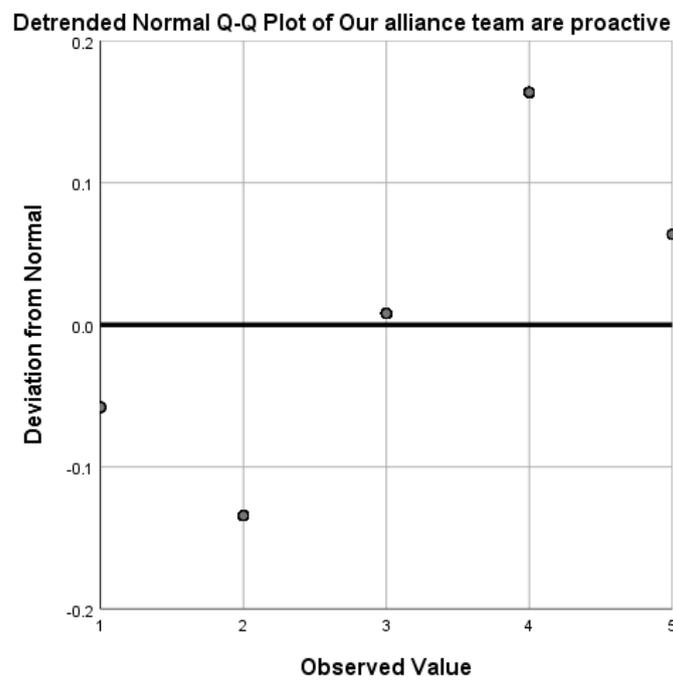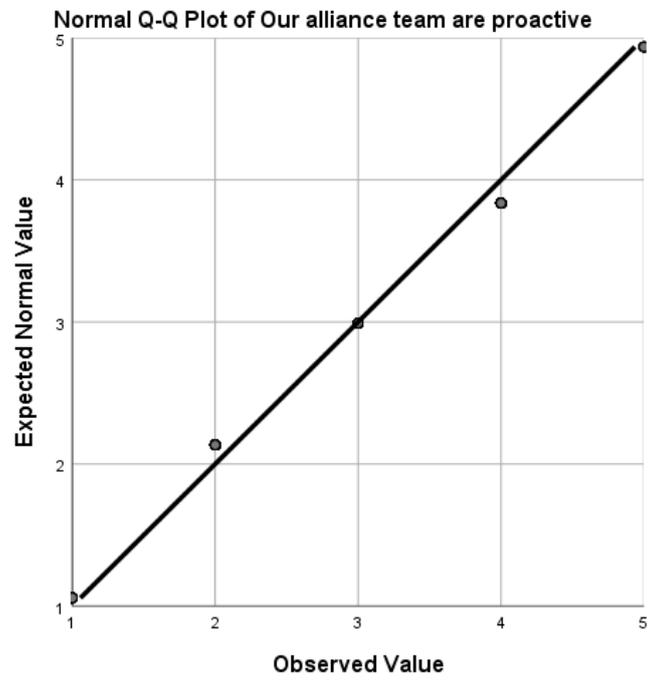
Contract_1

Normal Q-Q Plot of Our collaboration is regulated through a comprehensive, clearly worded contract
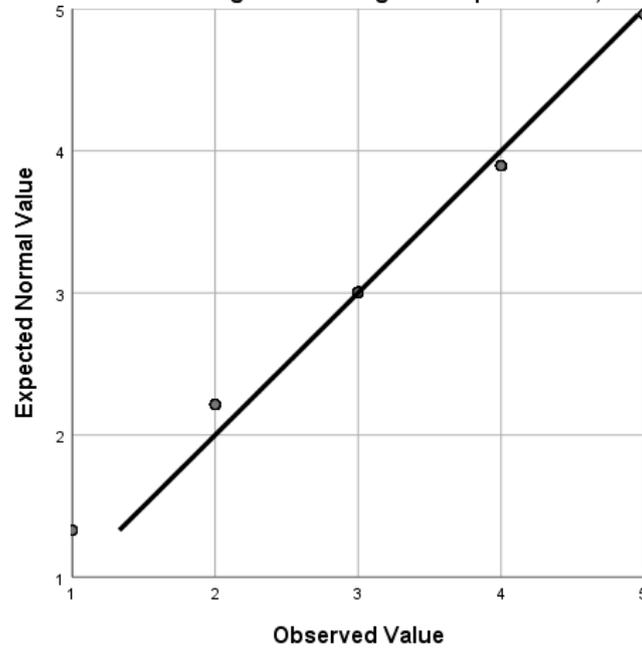
Detrended Normal Q-Q Plot of Our collaboration is regulated through a comprehensive, clearly worded contract
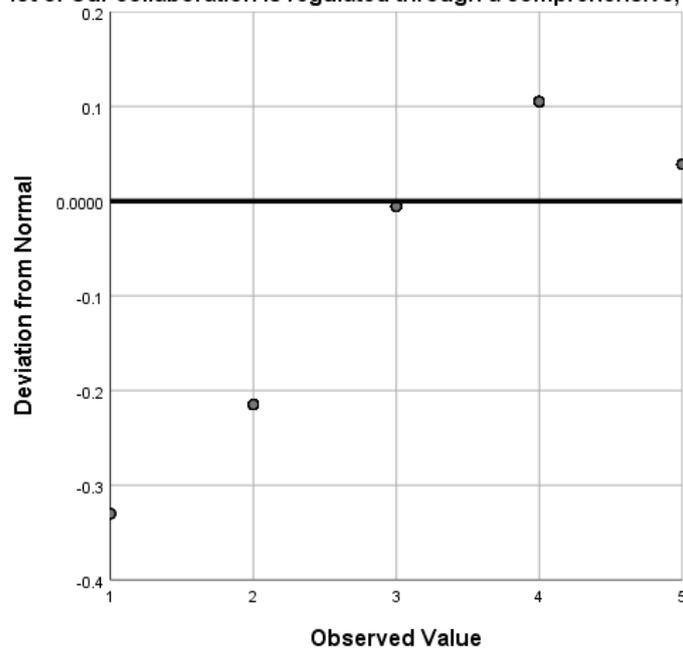
Contract_2

Normal Q-Q Plot of The contract with our partners describes in detail every aspect that we think is of interest
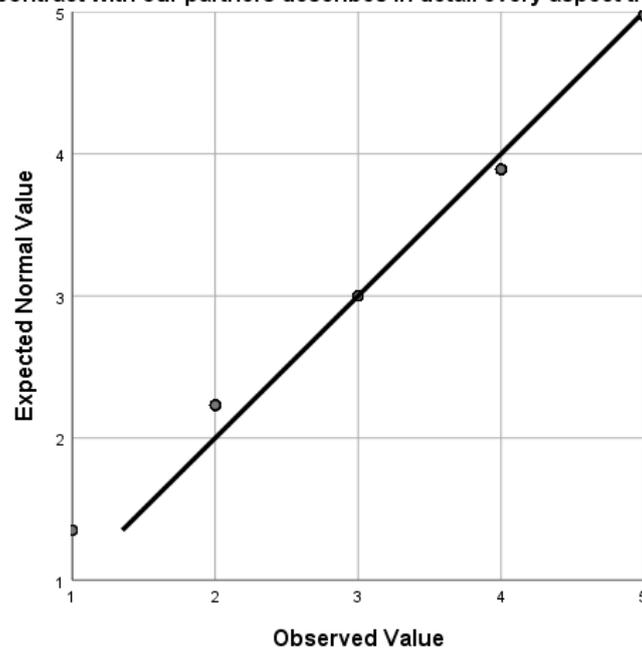
Detrended Normal Q-Q Plot of The contract with our partners describes in detail every aspect that we think is of interest
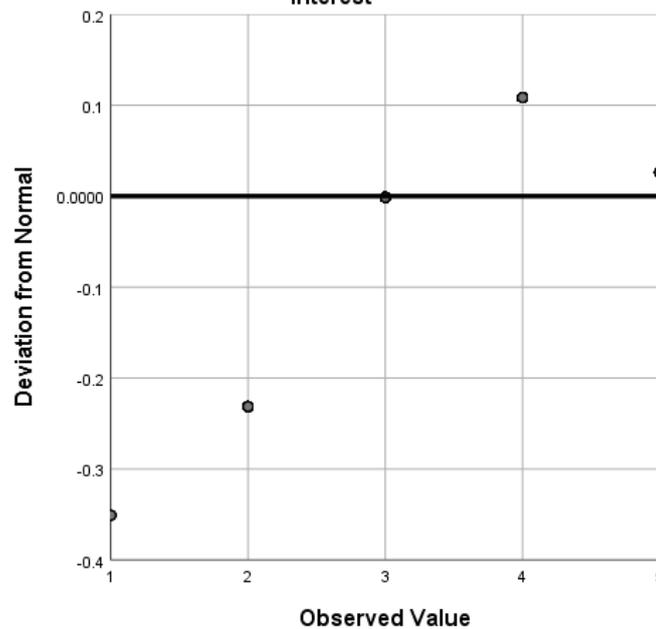
Contract_3

Normal Q-Q Plot of We and our partners fix all collaboration related details in a contract
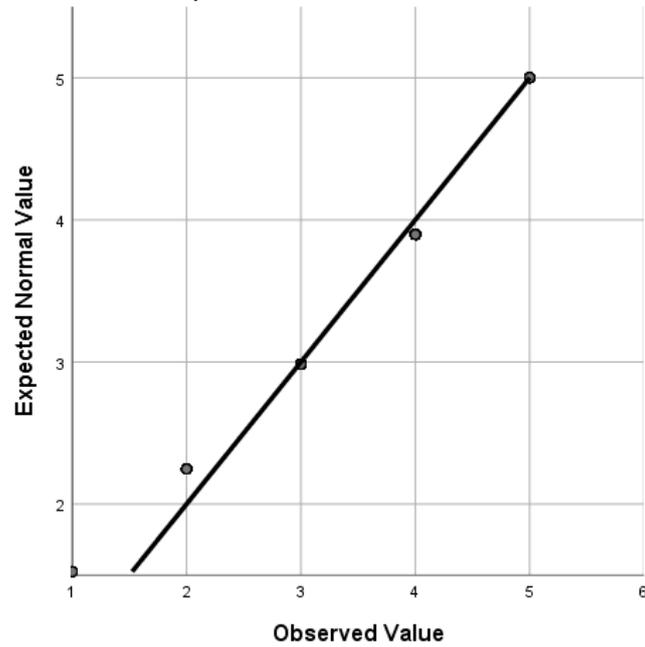
Detrended Normal Q-Q Plot of We and our partners fix all collaboration related details in a contract
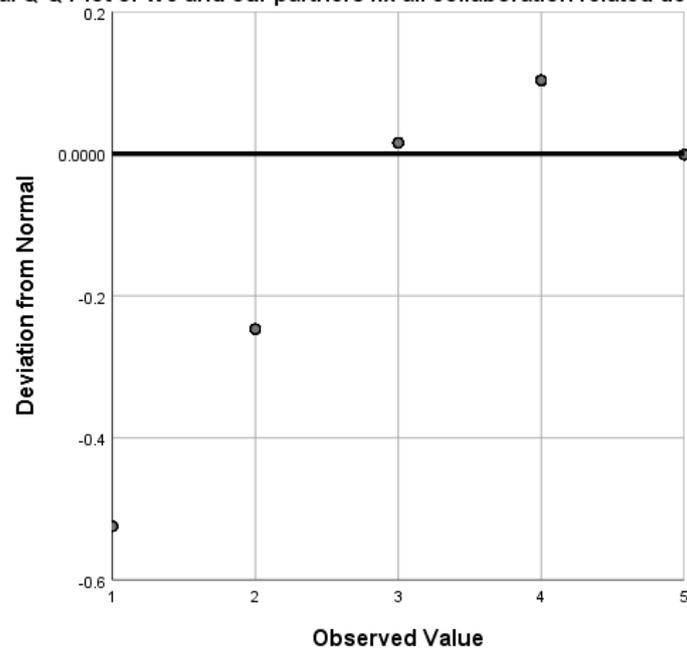
Contract_4

Normal Q-Q Plot of We are hesitant to transact with our partners when the specifications are vague
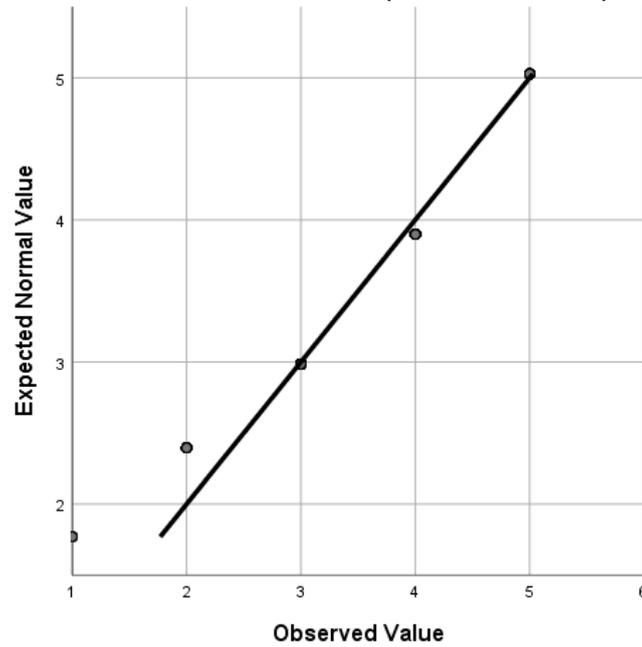
Detrended Normal Q-Q Plot of We are hesitant to transact with our partners when the specifications are vague
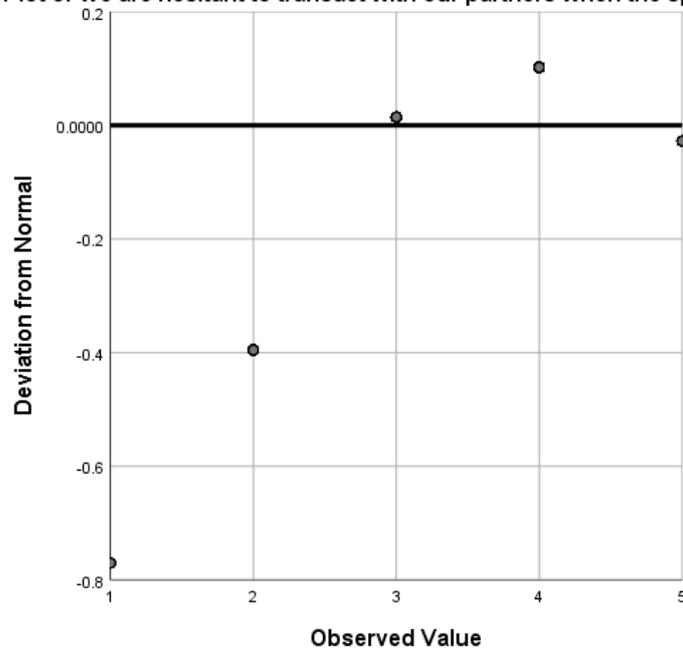
Contract_5

Normal Q-Q Plot of A contract is a necessary condition for coopetition
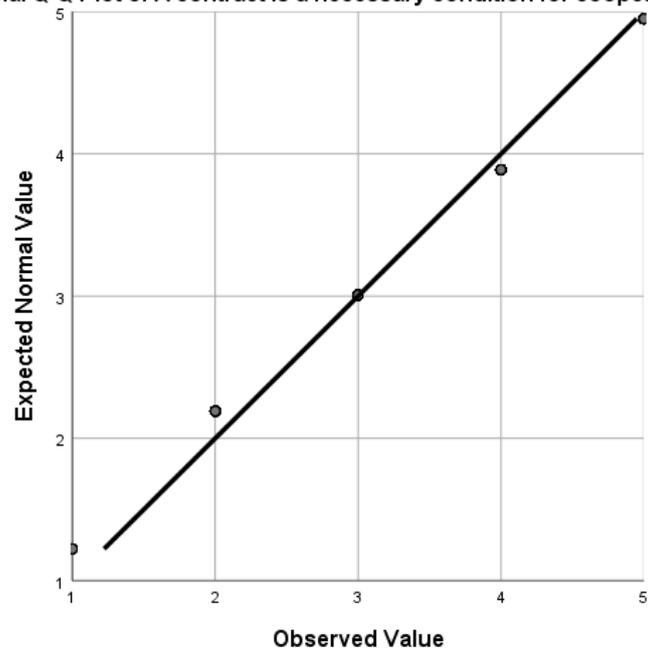
Detrended Normal Q-Q Plot of A contract is a necessary condition for coopetition
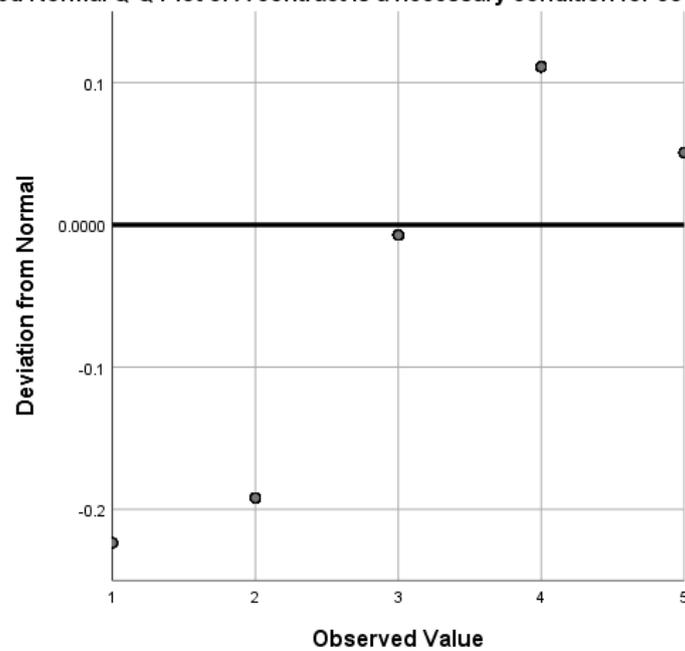
Contract_6

Normal Q-Q Plot of Contracts are more important than trust in a collaborative relationship
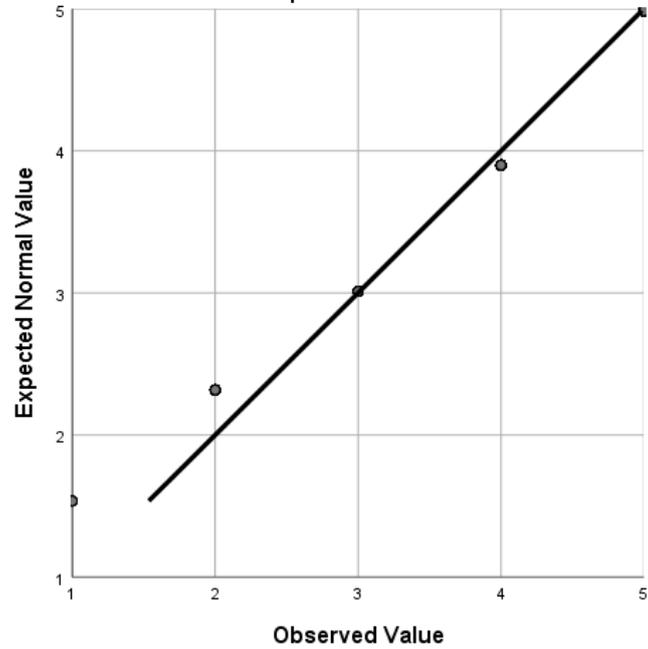
Detrended Normal Q-Q Plot of Contracts are more important than trust in a collaborative relationship
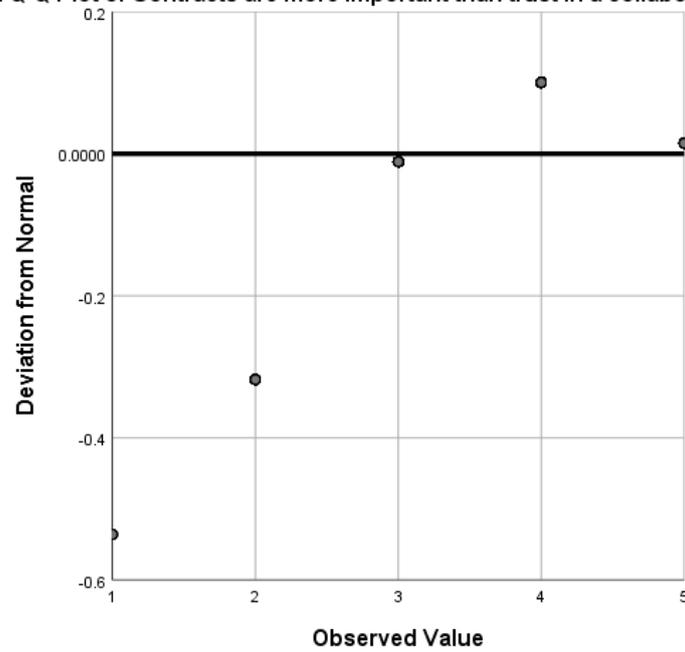
Contract_7

Normal Q-Q Plot of We rely on contracts for all alliances outside our organisation
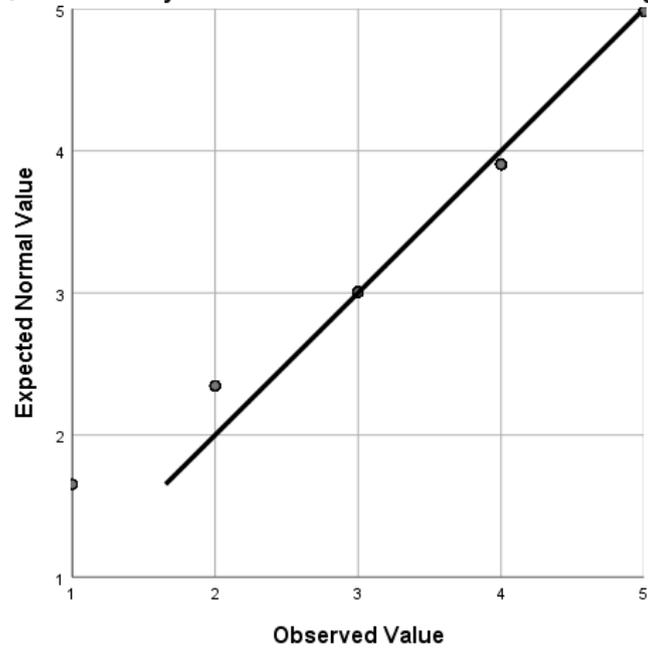
Detrended Normal Q-Q Plot of We rely on contracts for all alliances outside our organisation

ICP_1
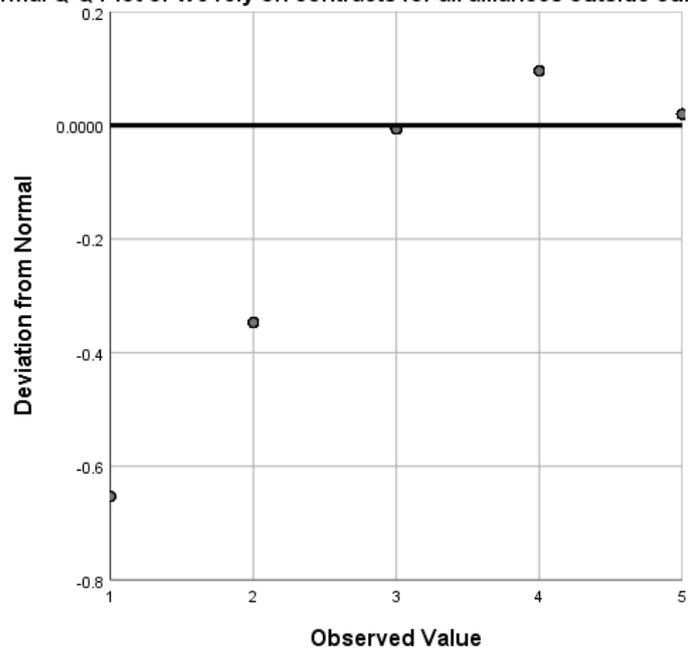
Normal Q-Q Plot of We are in close competition with our alliance partners
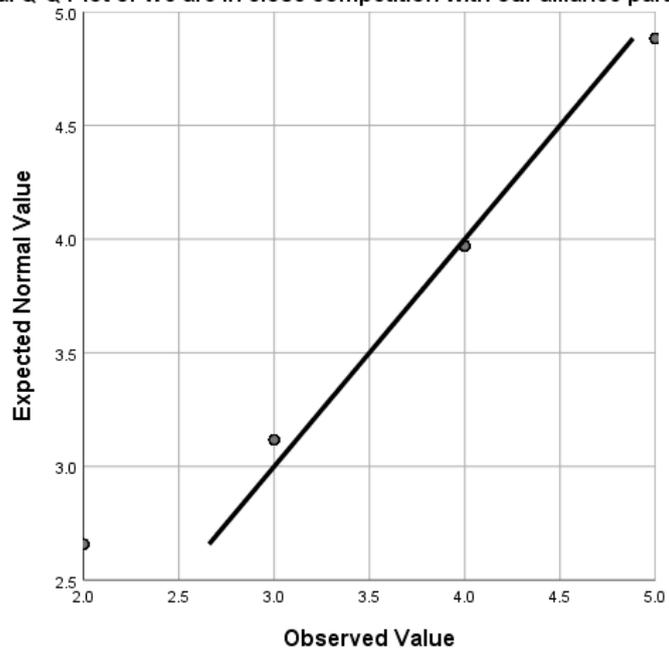
Detrended Normal Q-Q Plot of We are in close competition with our alliance partners
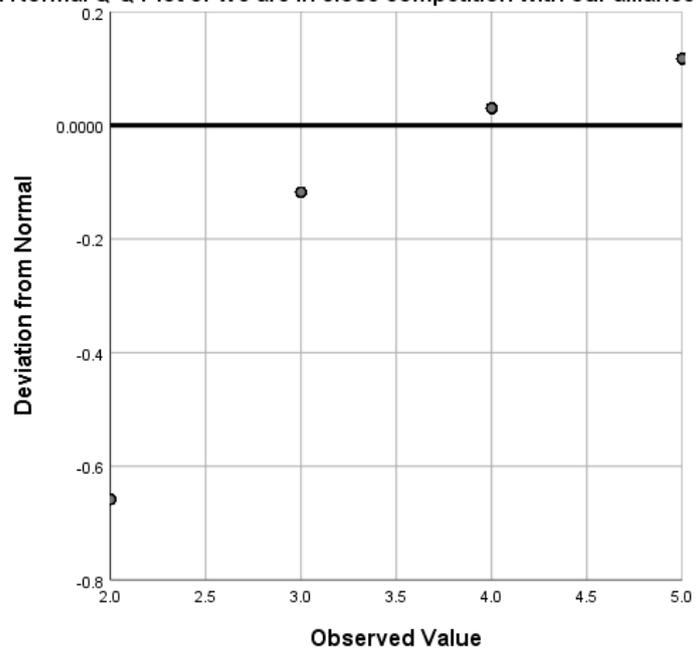
ICP_2

Normal Q-Q Plot of We are collaborating with competitors to achieve a common goal
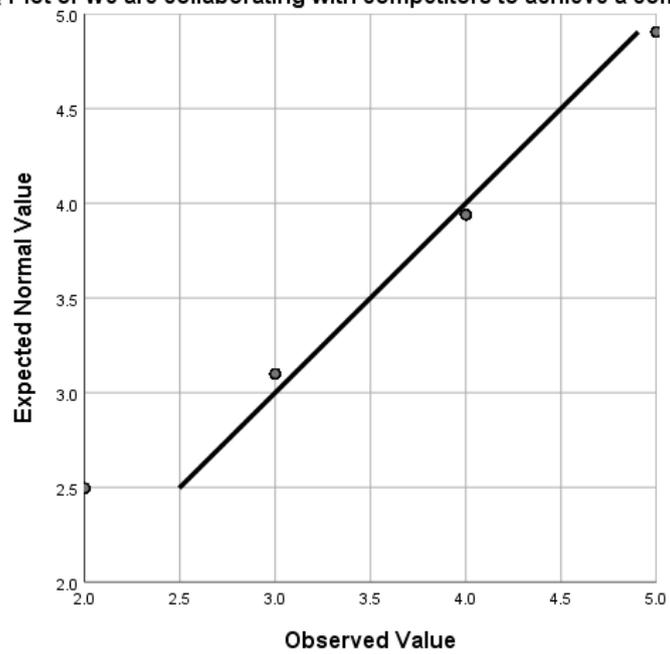
Normal Q-Q Plot of We deliberately enter every inter-organisatioank relationship
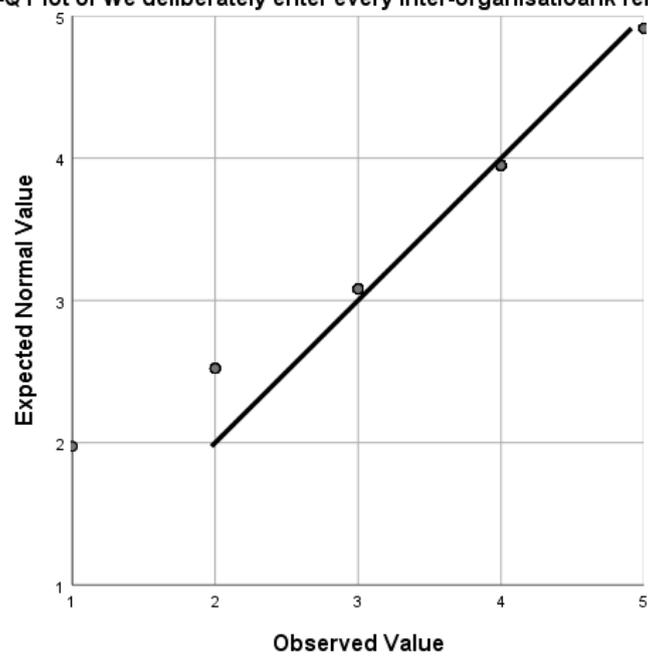
Detrended Normal Q-Q Plot of We deliberately enter every inter-organisatioank relationship

ICP_5

Normal Q-Q Plot of We are familiar with coopetition
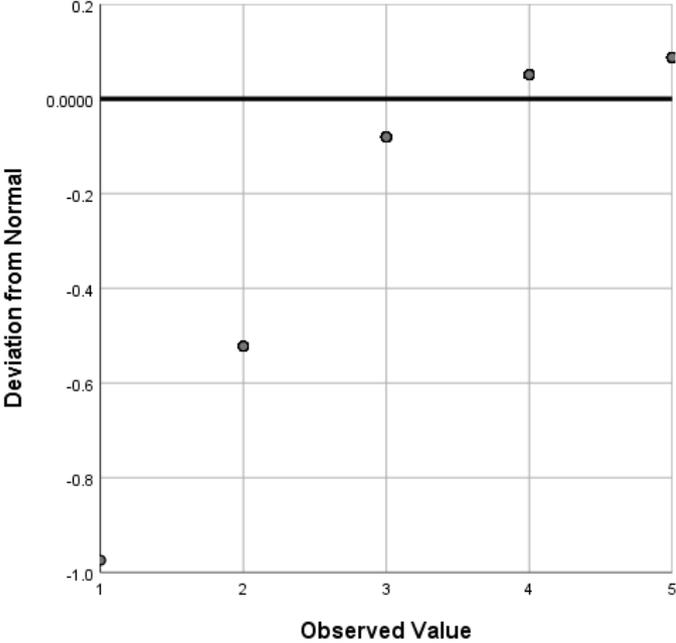
Detrended Normal Q-Q Plot of We are familiar with coopetition
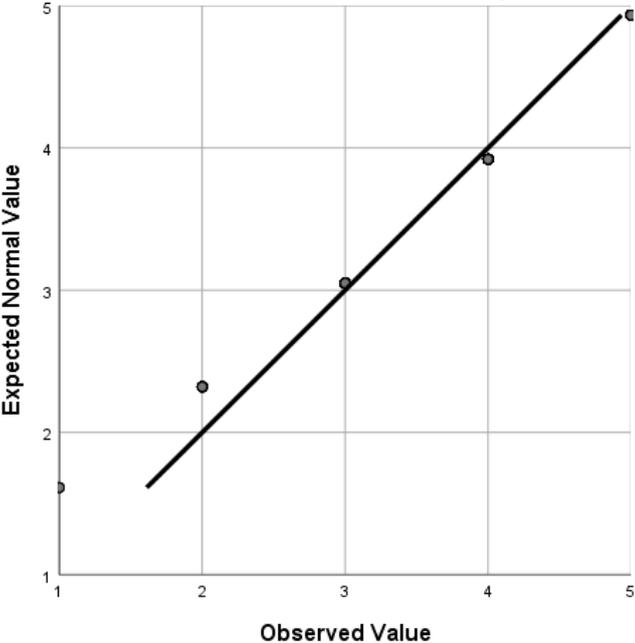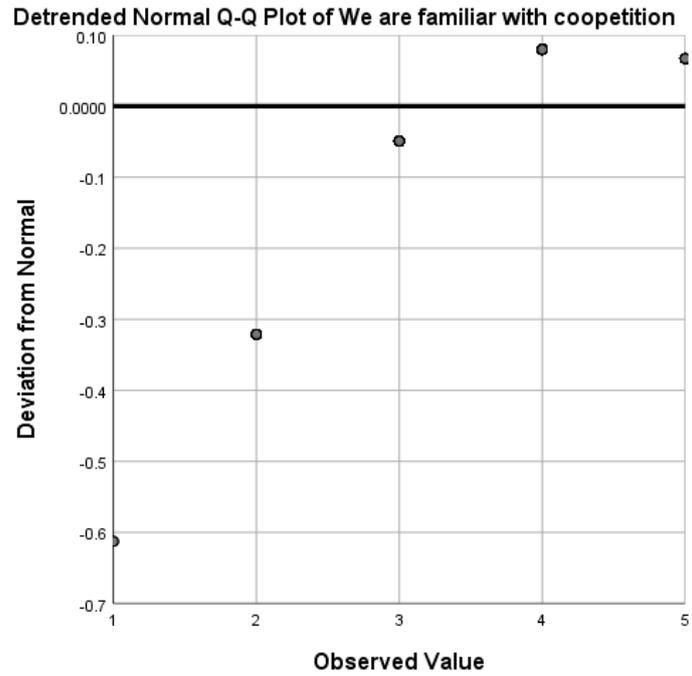
Man.Ten_1

Detrended Normal Q-Q Plot of An independent organisation should manage the relatinship among partners
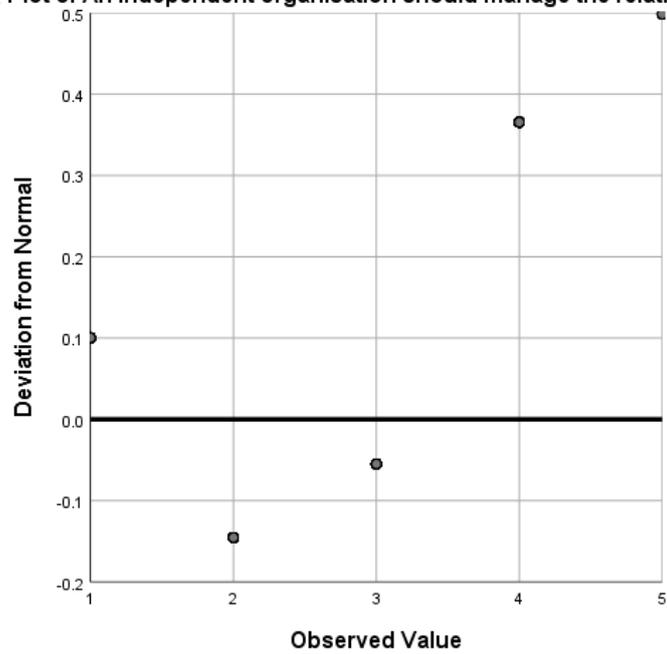
Man.Ten_2

Normal Q-Q Plot of A monitoring team should be formed internally among partners
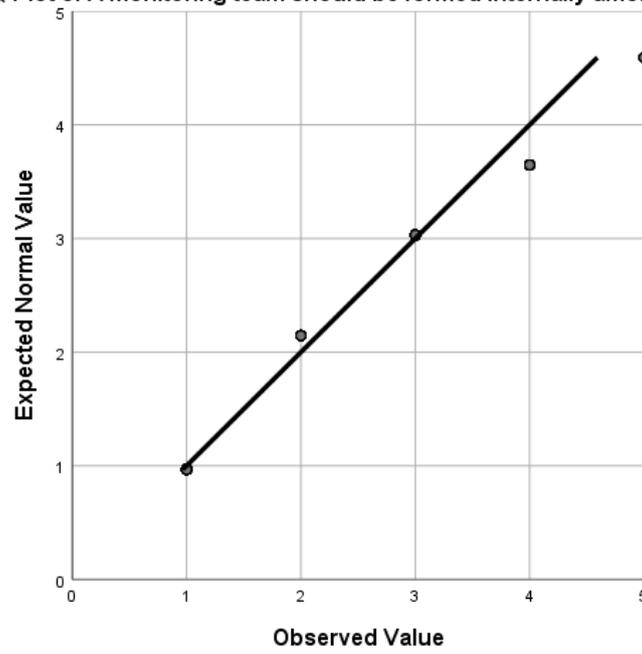
Detrended Normal Q-Q Plot of A monitoring team should be formed internally among partners
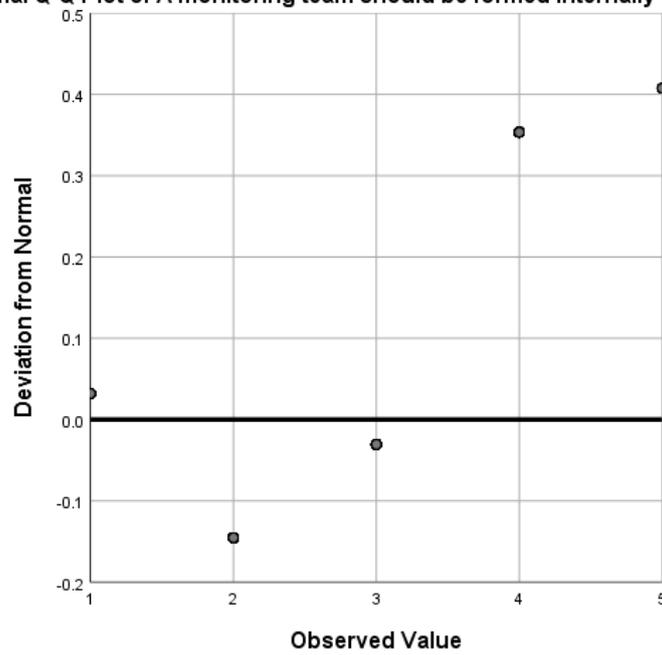
Man.Ten_3

Normal Q-Q Plot of The pre-competitive phase should be managed seperately from the competitive phase
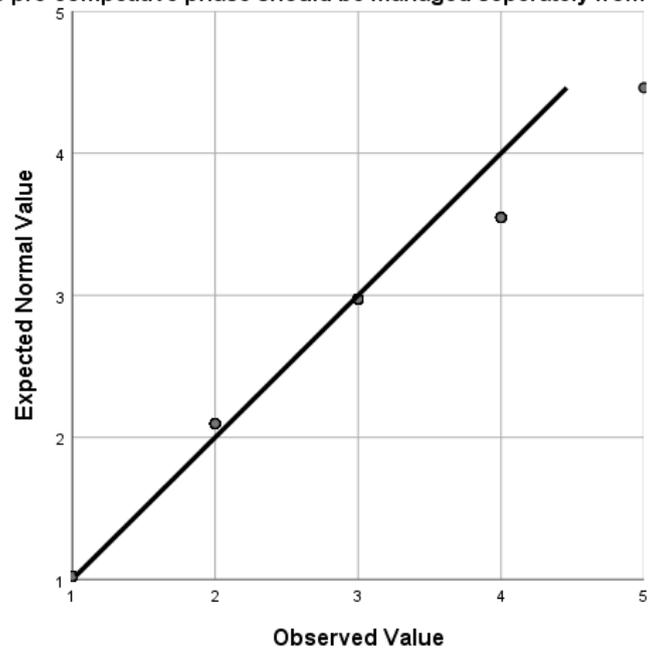
Detrended Normal Q-Q Plot of The pre-competitive phase should be managed seperately from the competitive phase
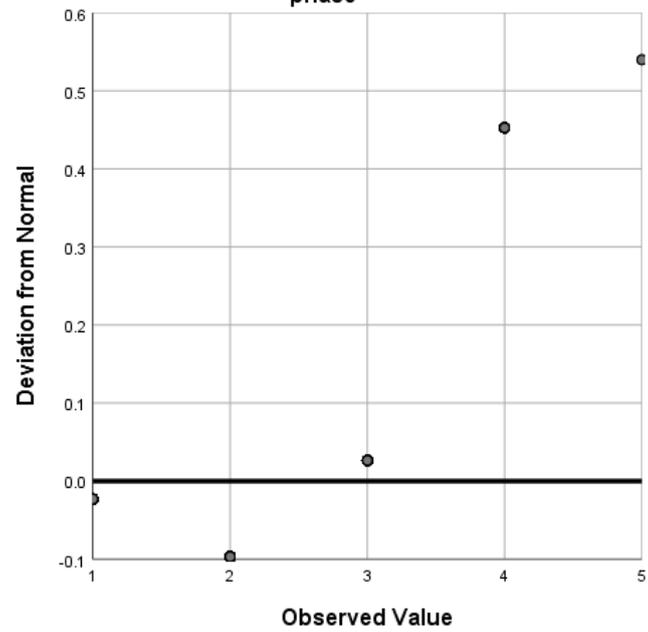
Man.Ten_4

Detrended Normal Q-Q Plot of The collaborative phase should be managed together with the competitive phase
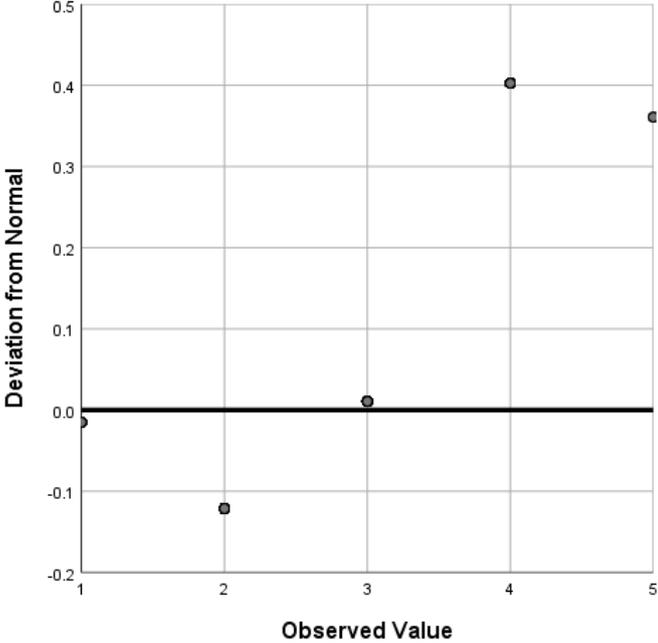
Man.Ten_5

Normal Q-Q Plot of The alliance should be reviewed regularly
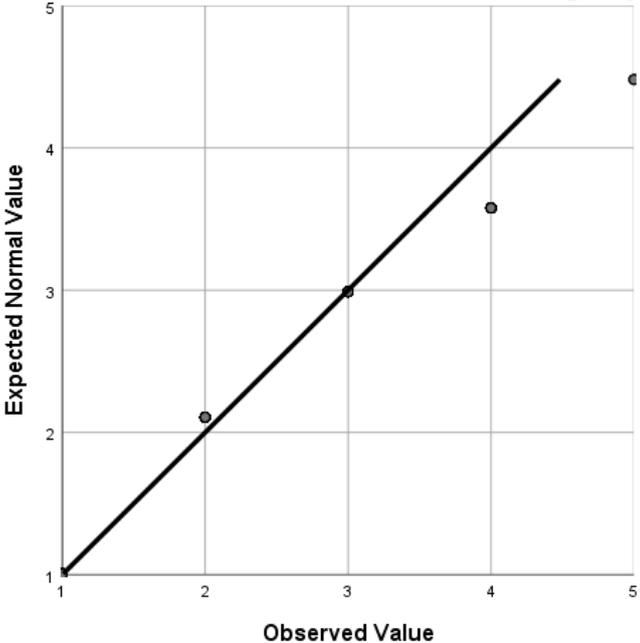
Detrended Normal Q-Q Plot of The alliance should be reviewed regularly
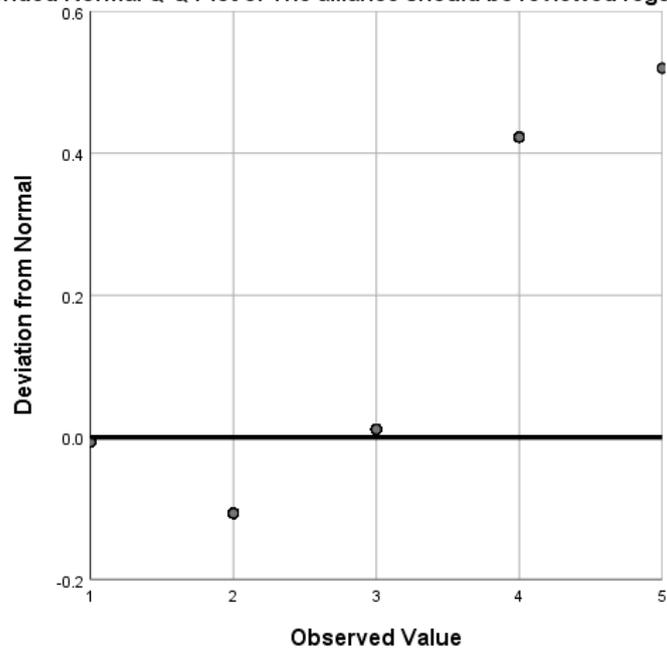
SCF_1

Normal Q-Q Plot of We have multiple suppliers fr each item in our supply chain
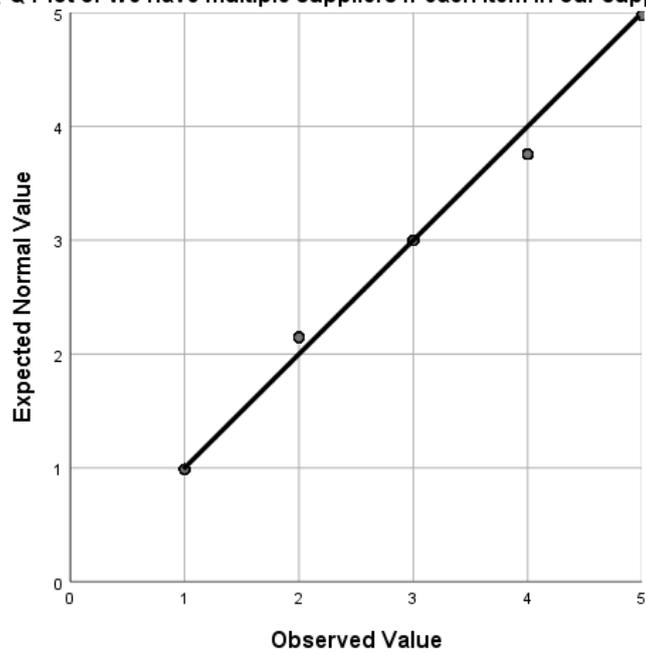
Detrended Normal Q-Q Plot of We have multiple suppliers fr each item in our supply chain
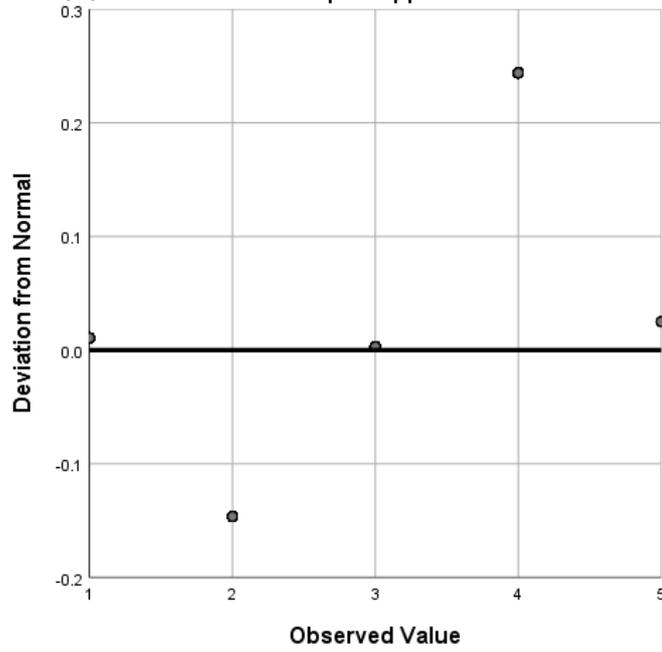
SCF_2

Normal Q-Q Plot of Collaboration helps us respond quicker to crisis
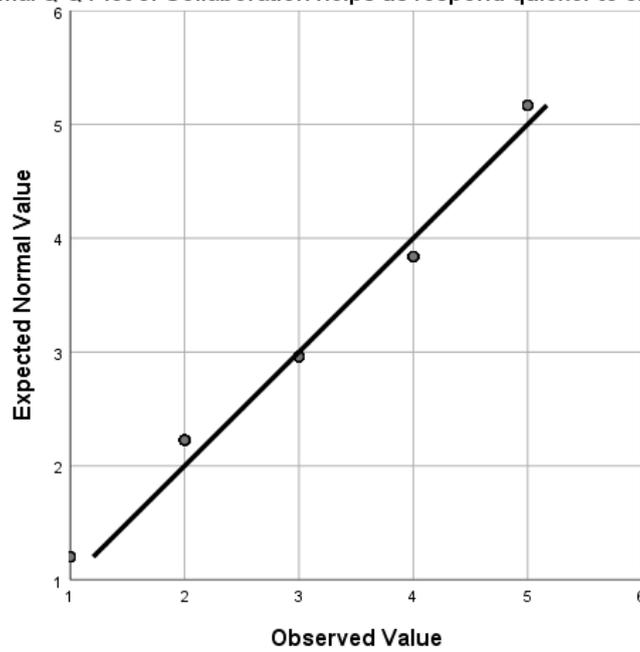
Detrended Normal Q-Q Plot of Collaboration helps us respond quicker to crisis
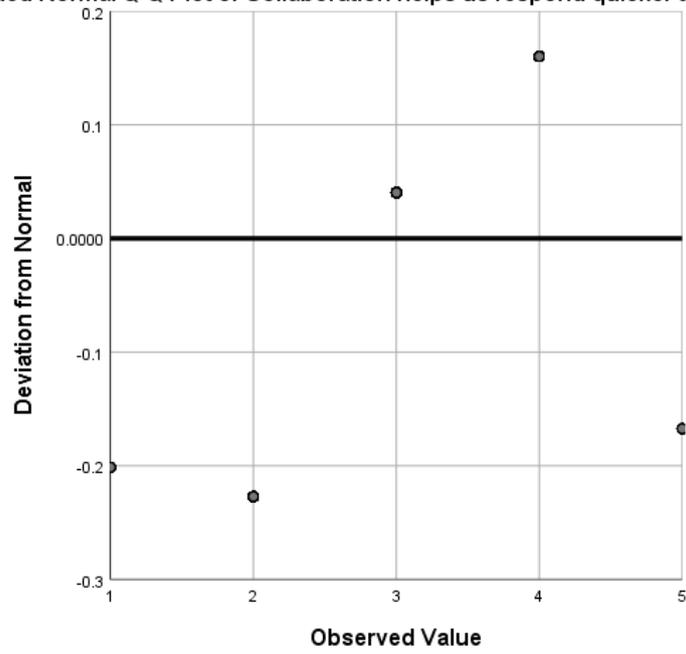
SCF_3

Normal Q-Q Plot of We have collaborative relationships with our supply chain partners
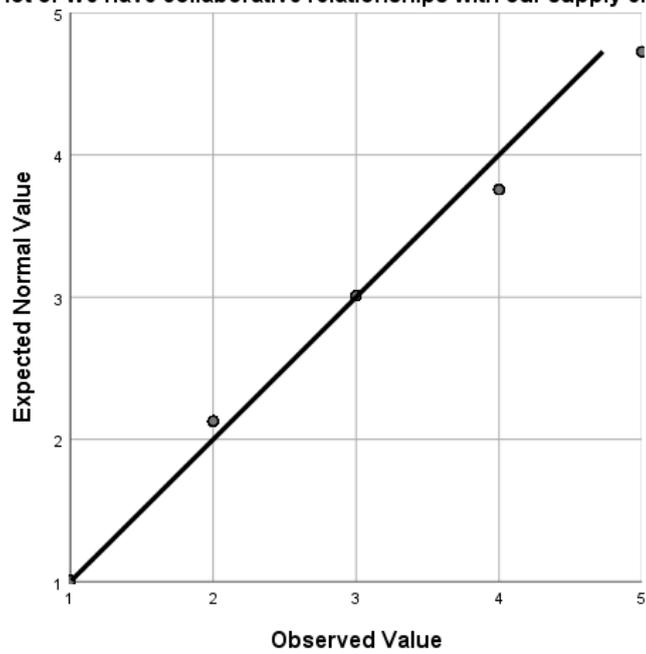
Detrended Normal Q-Q Plot of We have collaborative relationships with our supply chain partners
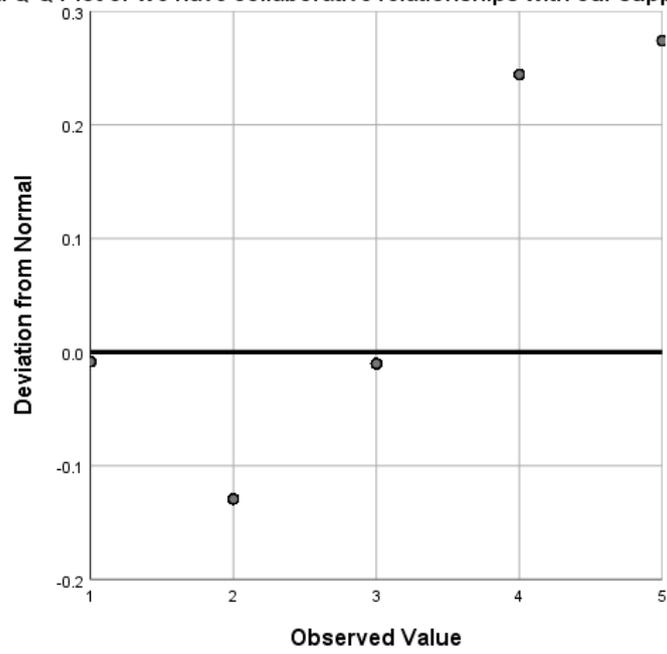
SCF_4

Normal Q-Q Plot of We can encourgae collaboration between our suppliers
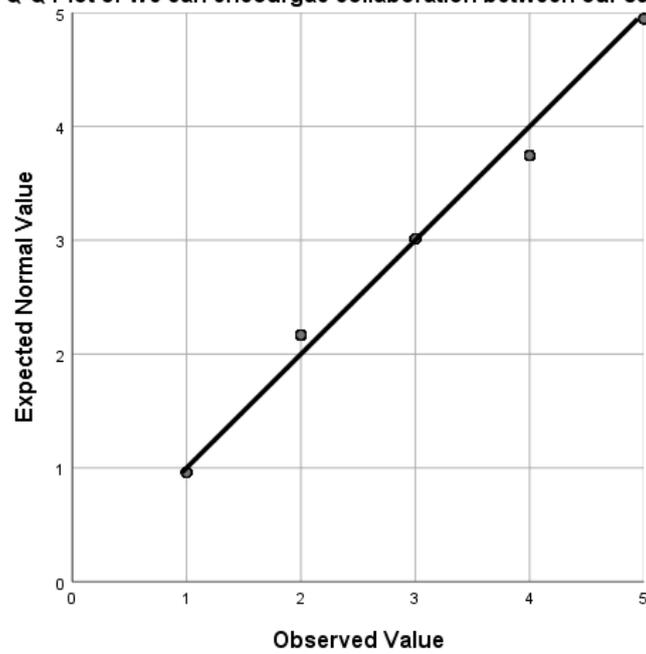
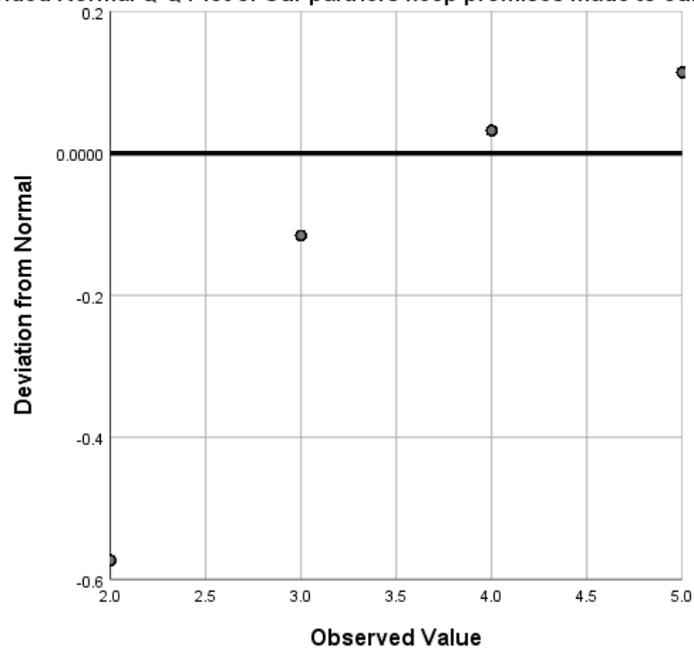Detrended Normal Q-Q Plot of We can encourgae collaboration between our suppliers
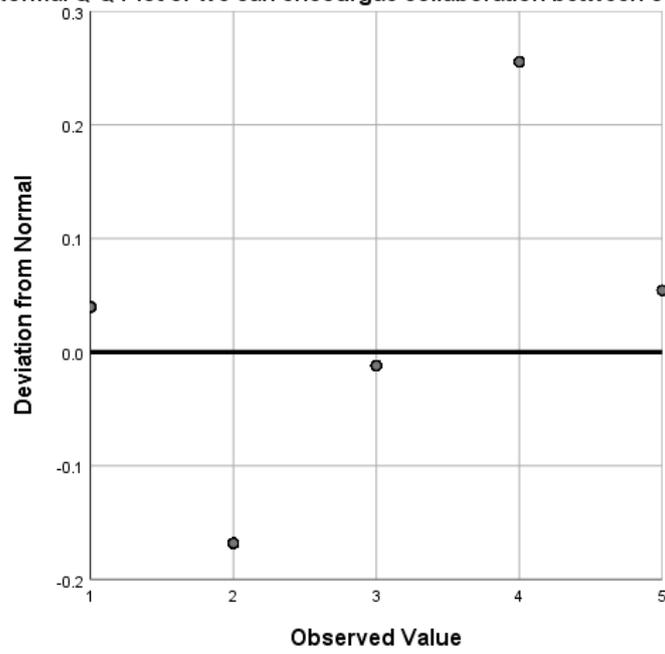
Trust_1

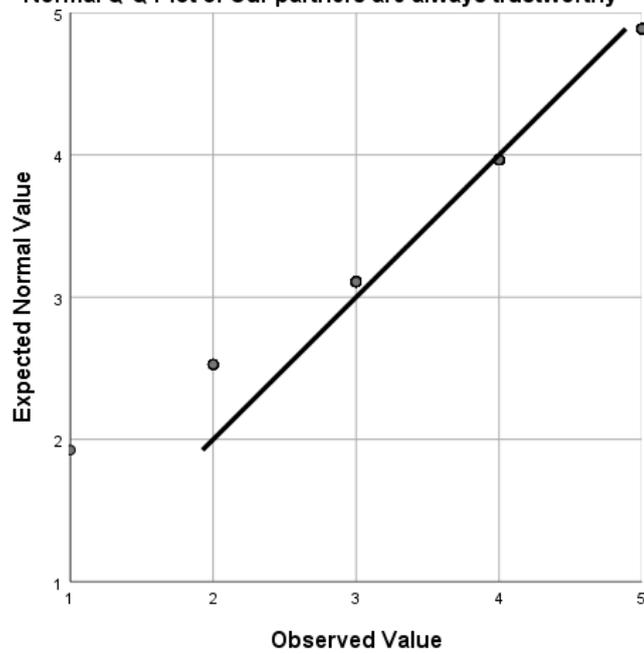Normal Q-Q Plot of Our partners keep promises made to our firm
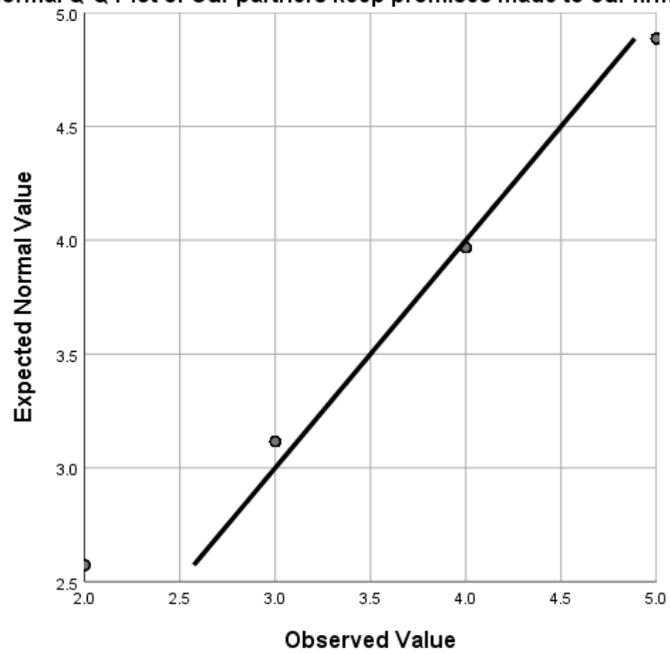
Detrended Normal Q-Q Plot of Our partners keep promises made to our firm
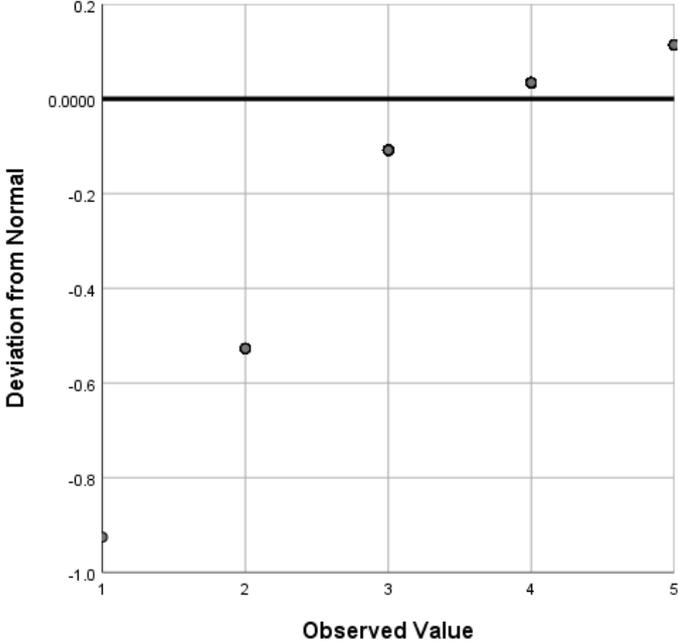
Trust_2
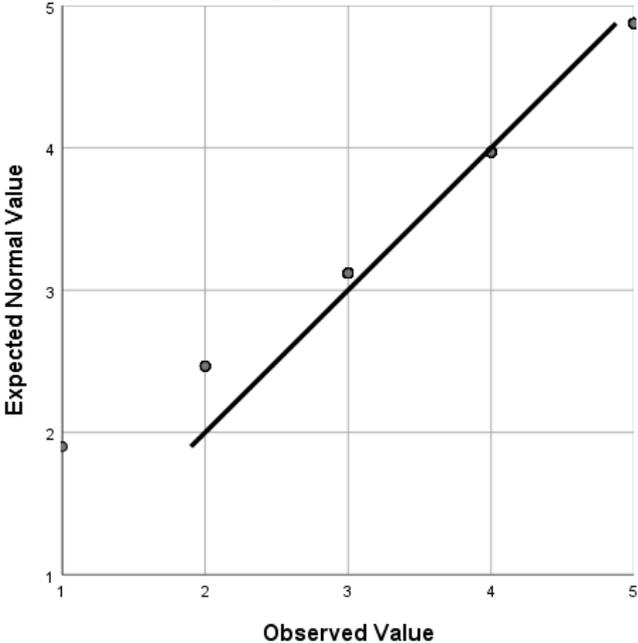

Normal Q-Q Plot of Our partners are always trustworthy

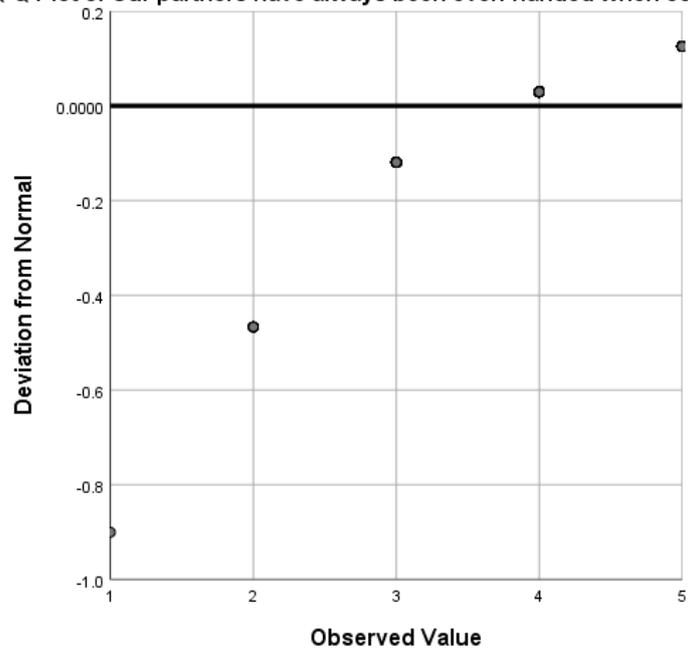**Detrended Normal Q-Q Plot of Our partners are always trustworthy**

Trust_3

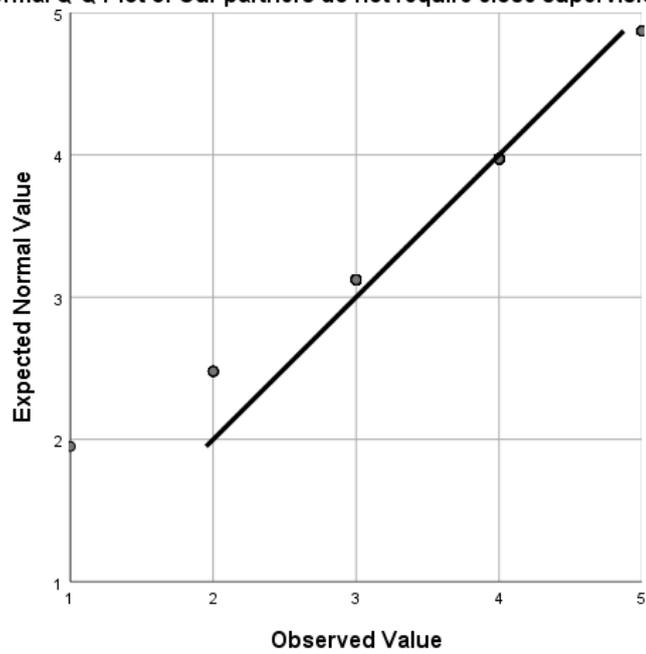**Normal Q-Q Plot of Our partners have always been even-handed when collaboarting with us.**

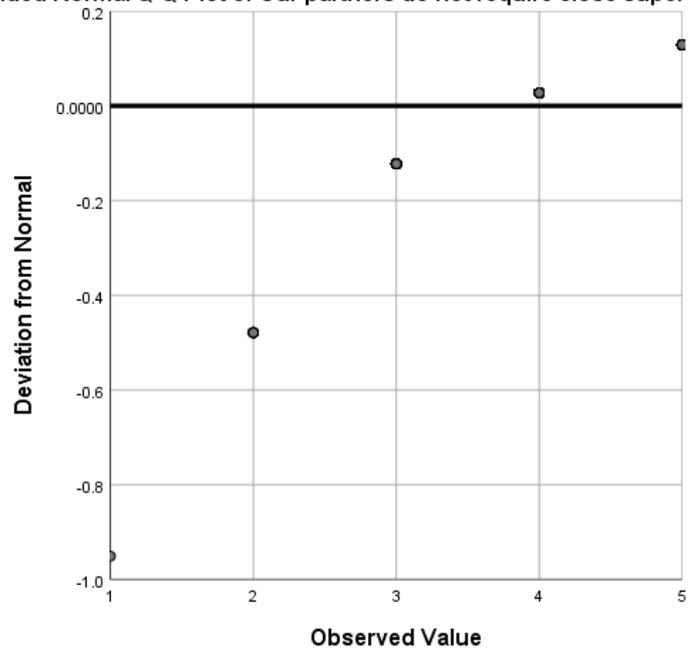Detrended Normal Q-Q Plot of Our partners have always been even-handed when collaboarting with us.

Trust_4

Normal Q-Q Plot of Our partners do not require close supervision

Detrended Normal Q-Q Plot of Our partners do not require close supervision

Trust_5

Normal Q-Q Plot of Our partners are truthful

Detrended Normal Q-Q Plot of Our partners are truthful

Trust_6

Normal Q-Q Plot of Competitors cannot be trusted
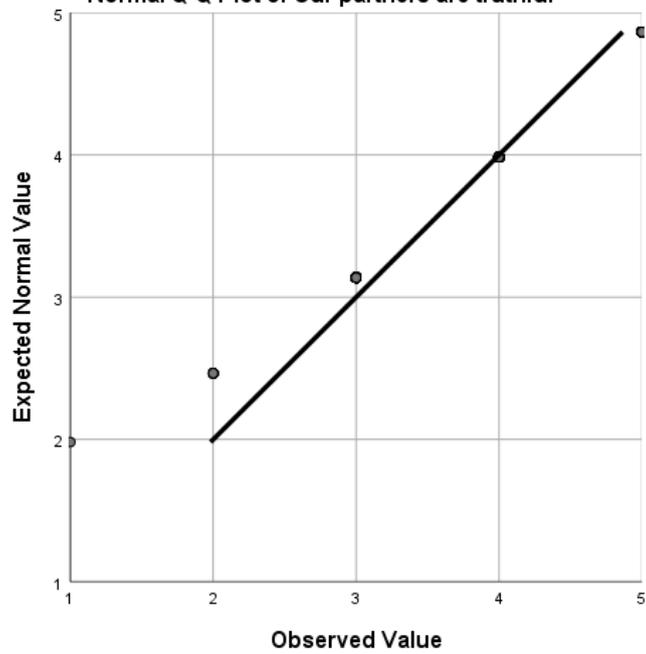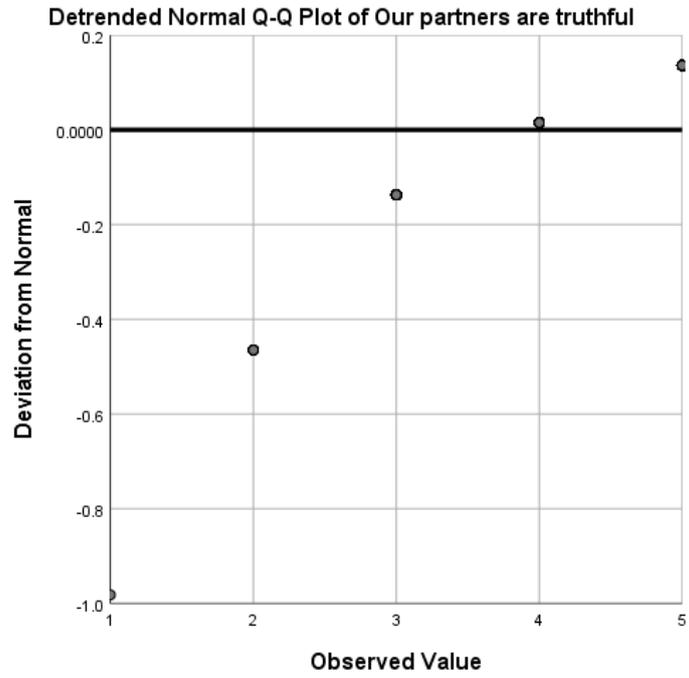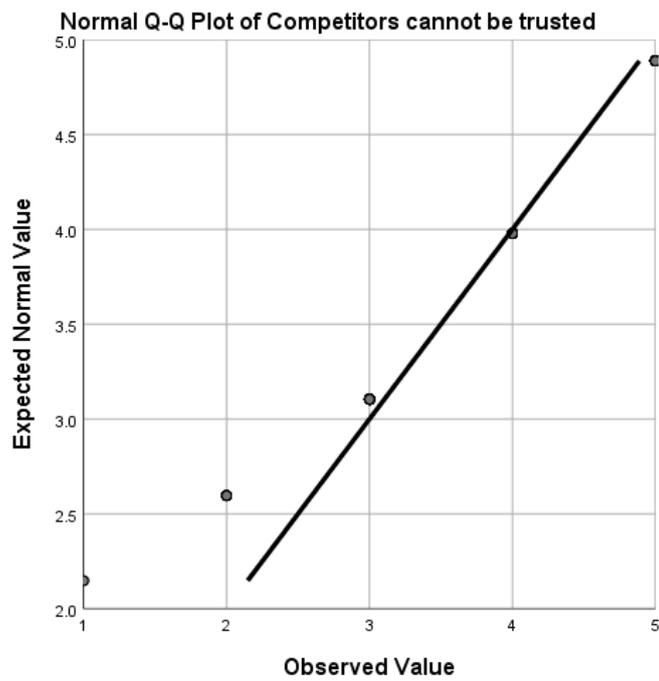
Detrended Normal Q-Q Plot of Competitors cannot be trusted
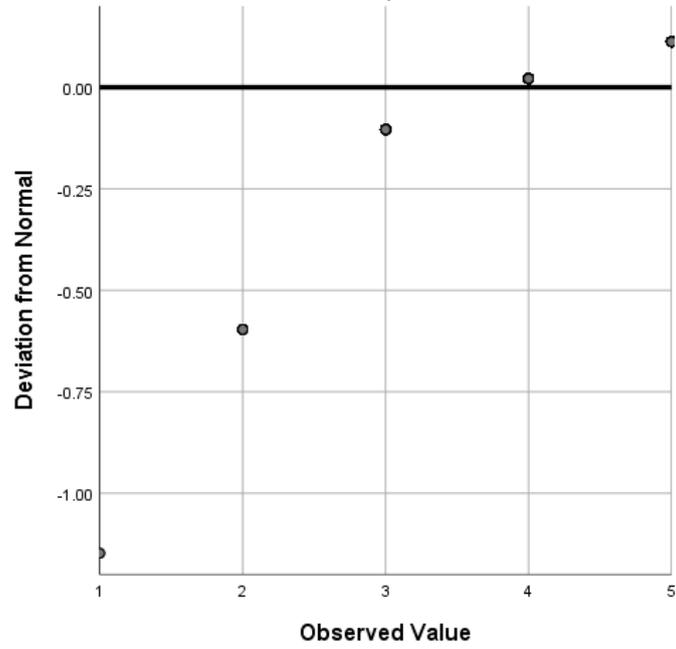
Trust_7

Normal Q-Q Plot of Trust is necessary for coopetition
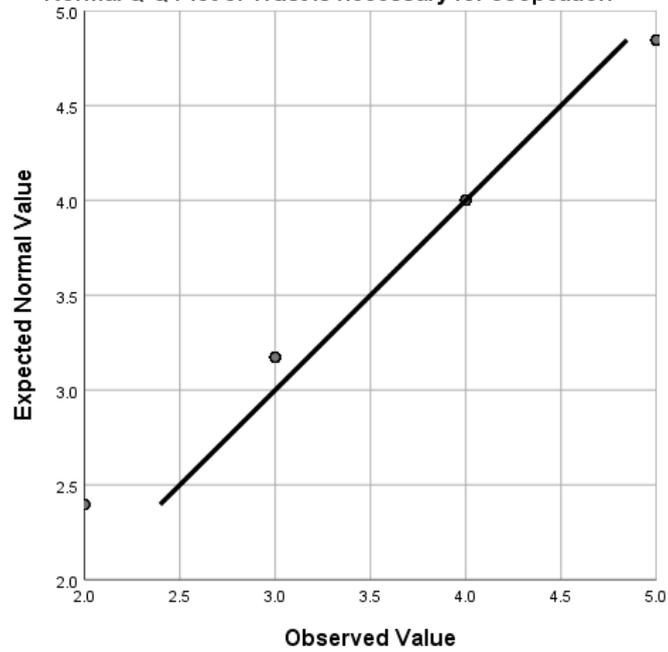
Detrended Normal Q-Q Plot of Trust is necessary for coopetition
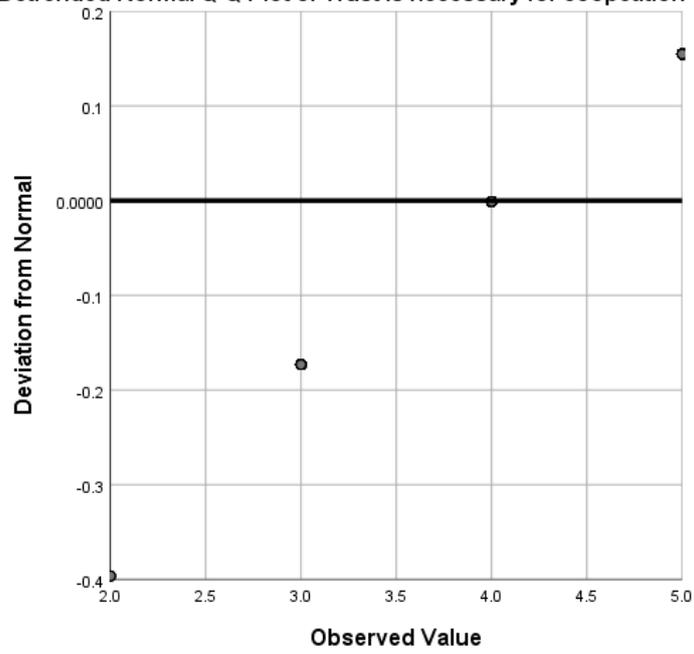
UCP_2

Normal Q-Q Plot of Competitors collaborate often in my industry
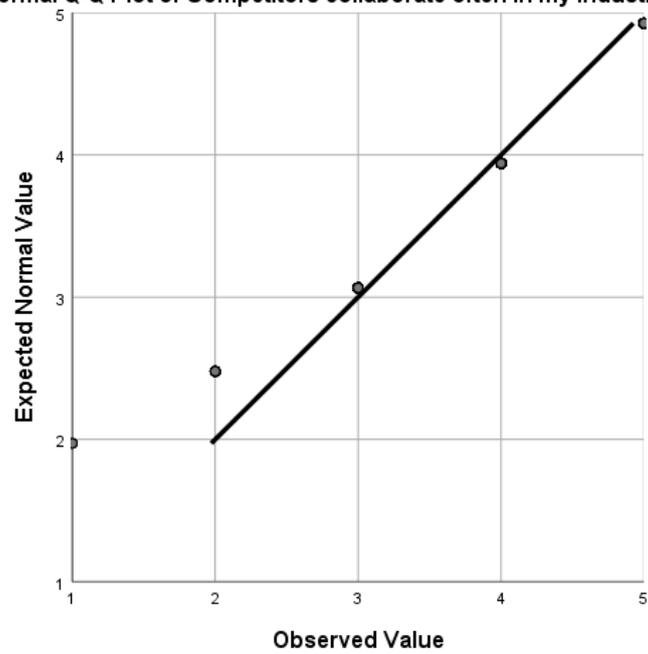
Detrended Normal Q-Q Plot of Competitors collaborate often in my industry
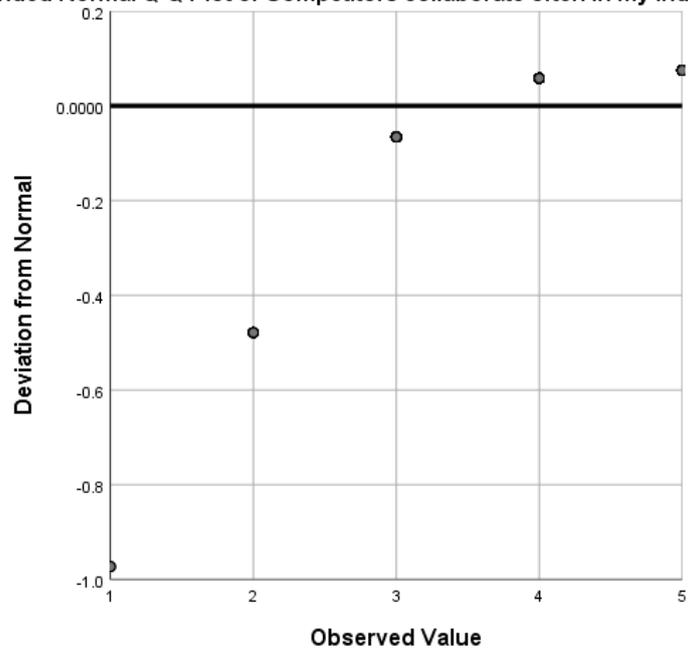
UCP_3

Normal Q-Q Plot of I have had to work closely with a competitor in the past
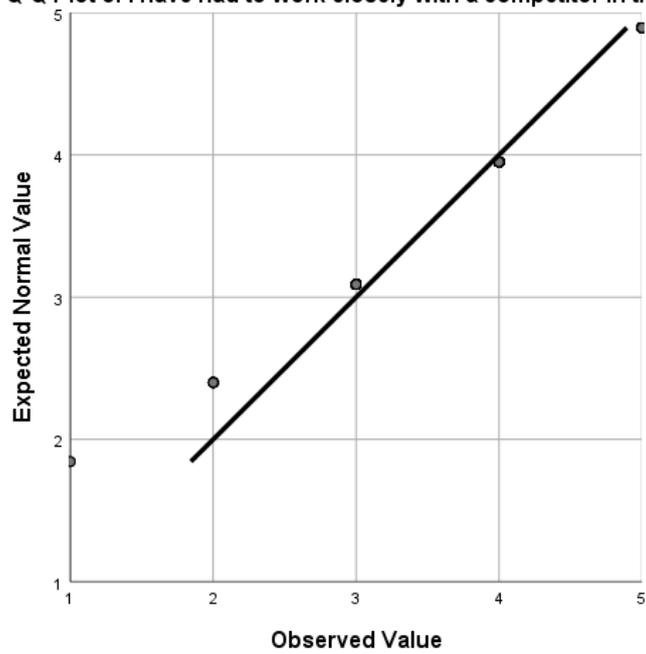
Detrended Normal Q-Q Plot of I have had to work closely with a competitor in the past
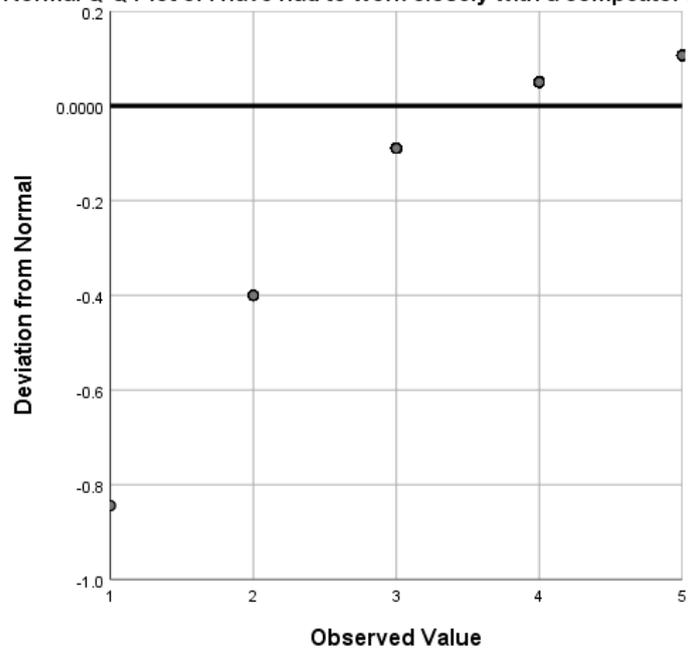
UCP_4

Normal Q-Q Plot of Our industry encourages collaboration
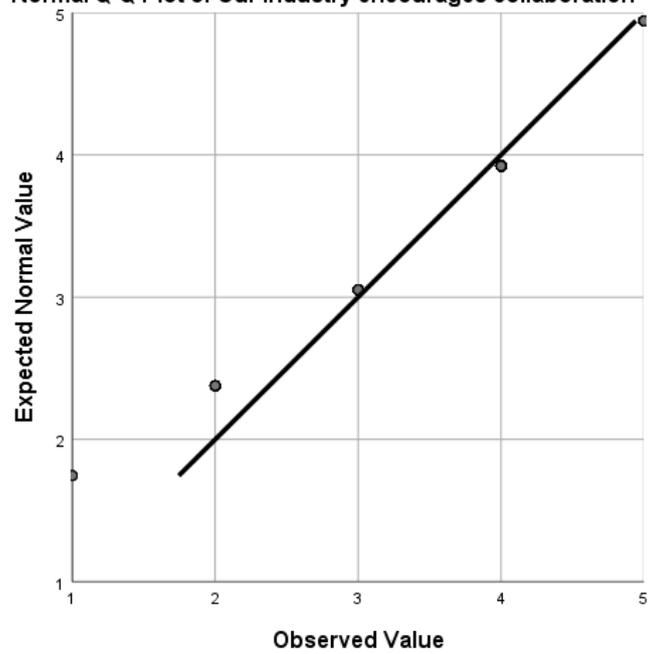
Detrended Normal Q-Q Plot of Our industry encourages collaboration
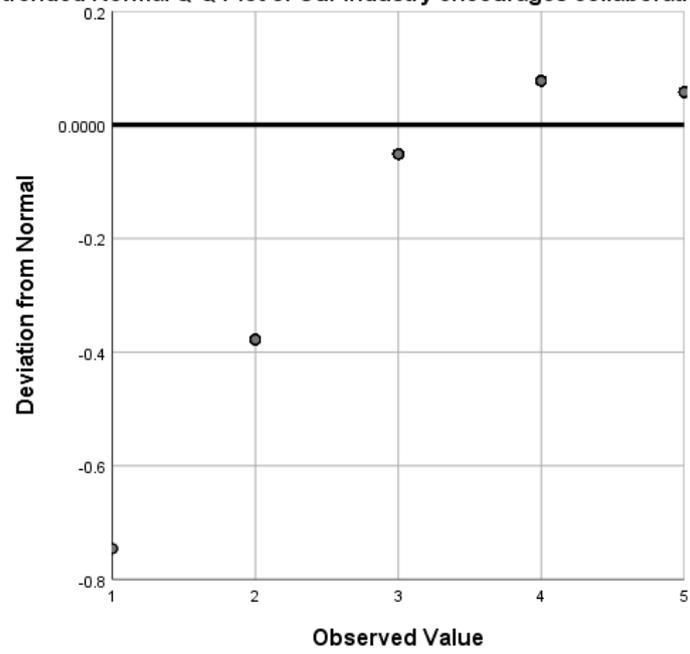
UCP_5

Normal Q-Q Plot of Collaboration should only occur between indirect competitors
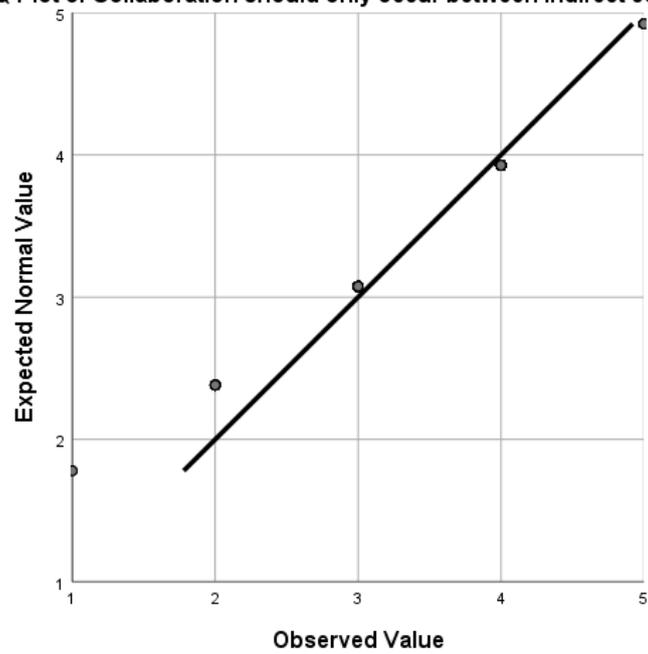
Detrended Normal Q-Q Plot of Collaboration should only occur between indirect competitors

UCP_7

Normal Q-Q Plot of Our supply chain is reactive
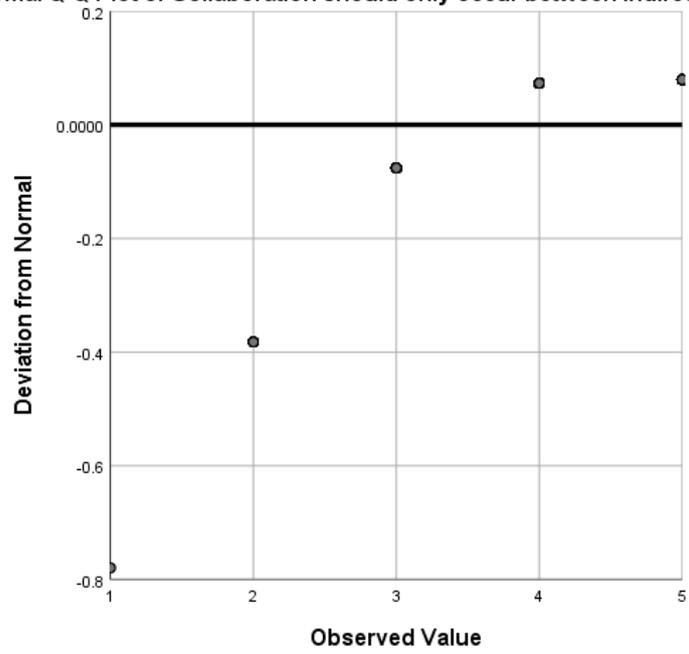
Detrended Normal Q-Q Plot of Our supply chain is reactive
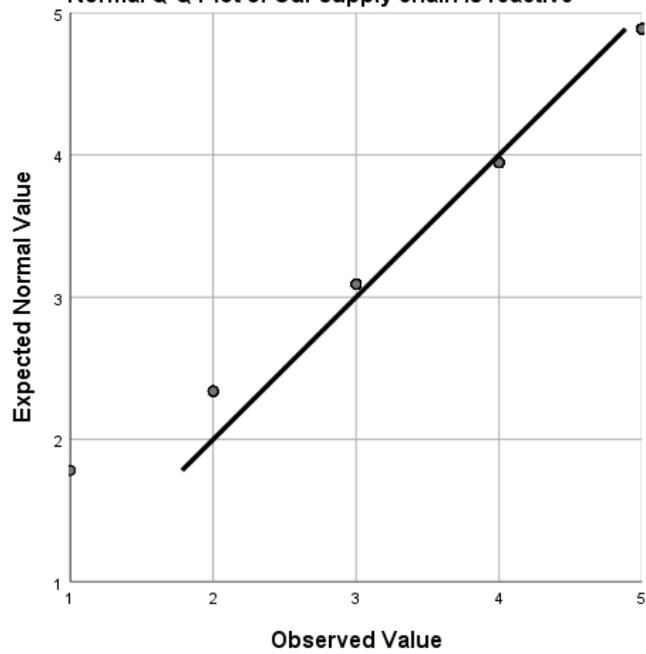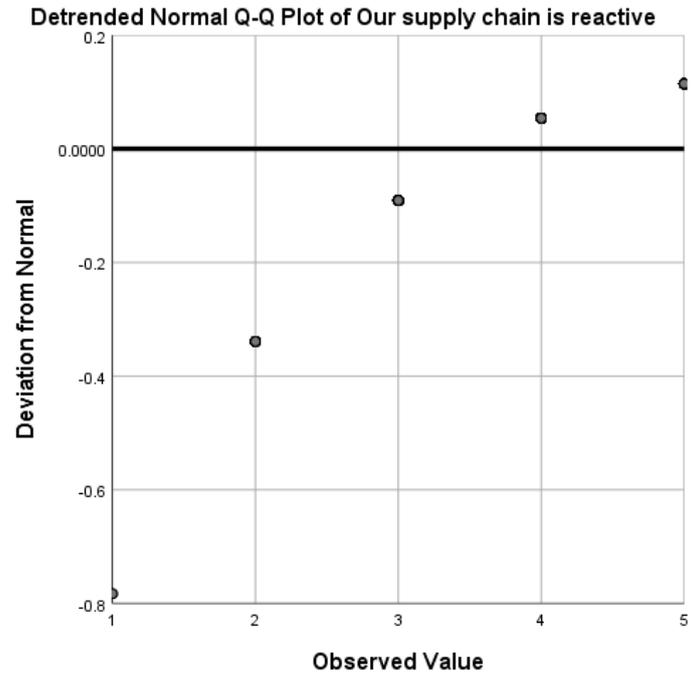
Appendix 9:

Reliability Test

Alliance Function

Reliability Statistics

Cronbach's Alpha	N of Items
.912	7

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
All.Fun_1	17.56	20.876	.616	.911
All.Fun_2	17.43	19.079	.814	.891
All.Fun_3	17.56	19.730	.728	.900
All.Fun_4	17.19	19.596	.717	.901
All.Fun_5	17.29	18.898	.784	.894
All.Fun_6	17.26	18.625	.815	.890
All.Fun_7	17.41	20.115	.661	.907

Contracts

Reliability Statistics

Cronbach's Alpha	N of Items
.939	7

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Contract_1	21.482	21.749	.721	.937
Contract_2	21.453	20.924	.828	.927
Contract_3	21.403	21.244	.807	.929
Contract_4	21.221	21.698	.833	.927
Contract_5	21.571	21.011	.793	.930

Contract_6	21.300	21.762	.797	.930
Contract_7	21.224	21.504	.827	.927

Intended Coopetition Performance

Reliability Statistics

Cronbach's Alpha	N of Items
.842	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ICP_1	15.584	4.935	.669	.804
ICP_2	15.726	4.785	.667	.804
ICP_3	15.476	5.047	.698	.800
ICP_4	15.661	4.631	.700	.795
ICP_5	15.879	4.761	.539	.846

Tension Management

Reliability Statistics

Cronbach's Alpha	N of Items
.931	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Man.Ten_1	9.03	10.371	.777	.924
Man.Ten_2	9.07	9.958	.816	.917
Man.Ten_3	9.23	10.641	.861	.909
Man.Ten_4	9.18	10.260	.831	.913
Man.Ten_5	9.19	10.633	.823	.915

Supply Chain Flexibility

Reliability Statistics

Cronbach's Alpha	N of Items
.816	4

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SCF_1	8.43	6.103	.639	.767
SCF_2	7.84	6.067	.655	.760
SCF_3	8.55	6.048	.628	.772
SCF_4	8.41	5.921	.623	.775

Trust

Reliability Statistics

Cronbach's Alpha	N of Items
.943	7

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Trust_1	24.163	13.219	.805	.934
Trust_2	24.208	13.110	.843	.931
Trust_3	24.205	12.992	.856	.930
Trust_4	24.211	13.037	.874	.928
Trust_5	24.145	13.148	.831	.932
Trust_6	24.121	13.489	.759	.938
Trust_7	24.100	13.816	.700	.943

Unintended Coopetition Performance

Reliability Statistics

Cronbach's Alpha	N of Items
.901	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
UCP_2	15.21	6.392	.767	.876
UCP_3	15.21	6.160	.823	.863
UCP_4	15.34	6.308	.741	.882
UCP_5	15.34	6.414	.773	.875
UCP_7	15.27	6.645	.665	.898

FACTOR ANALYSIS

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.930
Bartlett's Test of Sphericity	Approx. Chi-Square	11638.001
	df	780
	Sig.	.000

Communalities

	Initial	Extraction
All.Fun_1	1.000	.515
All.Fun_2	1.000	.770
All.Fun_3	1.000	.658
All.Fun_4	1.000	.648
All.Fun_5	1.000	.736
All.Fun_6	1.000	.778
All.Fun_7	1.000	.560
Contract_1	1.000	.622
Contract_2	1.000	.774
Contract_3	1.000	.754
Contract_4	1.000	.788
Contract_5	1.000	.738
Contract_6	1.000	.738
Contract_7	1.000	.785
ICP_1	1.000	.670
ICP_2	1.000	.670
ICP_3	1.000	.687
ICP_4	1.000	.669
ICP_5	1.000	.464
Man.Ten_1	1.000	.733
Man.Ten_2	1.000	.785
Man.Ten_3	1.000	.839
Man.Ten_4	1.000	.800
Man.Ten_5	1.000	.801
SCF_1	1.000	.662
SCF_2	1.000	.684
SCF_3	1.000	.656
SCF_4	1.000	.630
Trust_1	1.000	.749

Trust_2	1.000	.795
Trust_3	1.000	.818
Trust_4	1.000	.841
Trust_5	1.000	.779
Trust_6	1.000	.679
Trust_7	1.000	.621
UCP_2	1.000	.727
UCP_3	1.000	.806
UCP_4	1.000	.731
UCP_5	1.000	.747
UCP_7	1.000	.598

Extraction Method: Principal Component
Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	13.431	33.578	33.578	13.431	33.578	33.578	9.111
2	4.381	10.952	44.530	4.381	10.952	44.530	9.099
3	3.311	8.278	52.809	3.311	8.278	52.809	8.186
4	2.407	6.018	58.827	2.407	6.018	58.827	5.803
5	2.032	5.081	63.907	2.032	5.081	63.907	7.638
6	1.853	4.633	68.540	1.853	4.633	68.540	8.079
7	1.091	2.728	71.268	1.091	2.728	71.268	4.712
8	.740	1.851	73.119				
9	.702	1.755	74.874				
10	.656	1.639	76.513				
11	.593	1.482	77.995				
12	.560	1.401	79.396				
13	.534	1.334	80.731				
14	.525	1.312	82.043				
15	.505	1.262	83.305				
16	.469	1.172	84.477				
17	.439	1.097	85.574				
18	.420	1.049	86.623				
19	.415	1.038	87.661				
20	.395	.987	88.647				

21	.367	.917	89.564				
22	.353	.883	90.447				
23	.348	.871	91.318				
24	.313	.782	92.099				
25	.298	.745	92.844				
26	.290	.725	93.569				
27	.273	.682	94.251				
28	.264	.659	94.910				
29	.245	.613	95.524				
30	.230	.575	96.098				
31	.215	.537	96.635				
32	.194	.485	97.120				
33	.179	.446	97.566				
34	.174	.434	98.001				
35	.165	.411	98.412				
36	.155	.387	98.799				
37	.144	.359	99.158				
38	.128	.321	99.479				
39	.117	.292	99.771				
40	.092	.229	100.000				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

Pattern Matrix[a]

	Component						
	1	2	3	4	5	6	7
All.Fun_1			.704				
All.Fun_2			.899				
All.Fun_3			.804				
All.Fun_4			.722				
All.Fun_5			.887				
All.Fun_6			.904				
All.Fun_7			.686				
Contract_1		.707					
Contract_2		.884					
Contract_3		.847					
Contract_4		.879					
Contract_5		.873					
Contract_6		.834					

	1	2	3	4	5	6	7
Contract_7		.905					
ICP_1						.800	
ICP_2						.825	
ICP_3						.801	
ICP_4						.676	
ICP_5						.614	
Man.Ten_1				.807			
Man.Ten_2				.874			
Man.Ten_3				.928			
Man.Ten_4				.896			
Man.Ten_5				.910			
SCF_1							.804
SCF_2							.805
SCF_3							.829
SCF_4							.753
Trust_1	.866						
Trust_2	.813						
Trust_3	.892						
Trust_4	.906						
Trust_5	.911						
Trust_6	.828						
Trust_7	.774						
UCP_2					.804		
UCP_3					.887		
UCP_4					.898		
UCP_5					.831		
UCP_7					.598		

Extraction Method: Principal Component Analysis.

Rotation Method: Promax with Kaiser Normalization.[a]

a. Rotation converged in 6 iterations.

Component Correlation Matrix

Component	1	2	3	4	5	6	7
1	1.000	.464	.334	.224	.498	.503	.265
2	.464	1.000	.500	.202	.366	.464	.259
3	.334	.500	1.000	.376	.278	.375	.343
4	.224	.202	.376	1.000	.217	.200	.365
5	.498	.366	.278	.217	1.000	.609	.158
6	.503	.464	.375	.200	.609	1.000	.244

| 7 | .265 | .259 | .343 | .365 | .158 | .244 | 1.000 |

Extraction Method: Principal Component Analysis.

Rotation Method: Promax with Kaiser Normalization.

Component Score Covariance Matrix

Component	1	2	3	4	5	6	7
1	3.104	2.845	3.610	1.817	3.317	3.820	3.157
2	2.845	2.865	2.827	1.832	3.579	2.925	2.965
3	3.610	2.827	4.733	2.722	4.087	4.199	4.589
4	1.817	1.832	2.722	2.454	3.308	3.038	2.059
5	3.317	3.579	4.087	3.308	5.733	4.043	2.674
6	3.820	2.925	4.199	3.038	4.043	5.599	3.096
7	3.157	2.965	4.589	2.059	2.674	3.096	3.851

Extraction Method: Principal Component Analysis.

Rotation Method: Promax with Kaiser Normalization.

Component Scores.